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Infant Mortality Statistics from the 2007 Period Linked Birth/Infant Death Data Set

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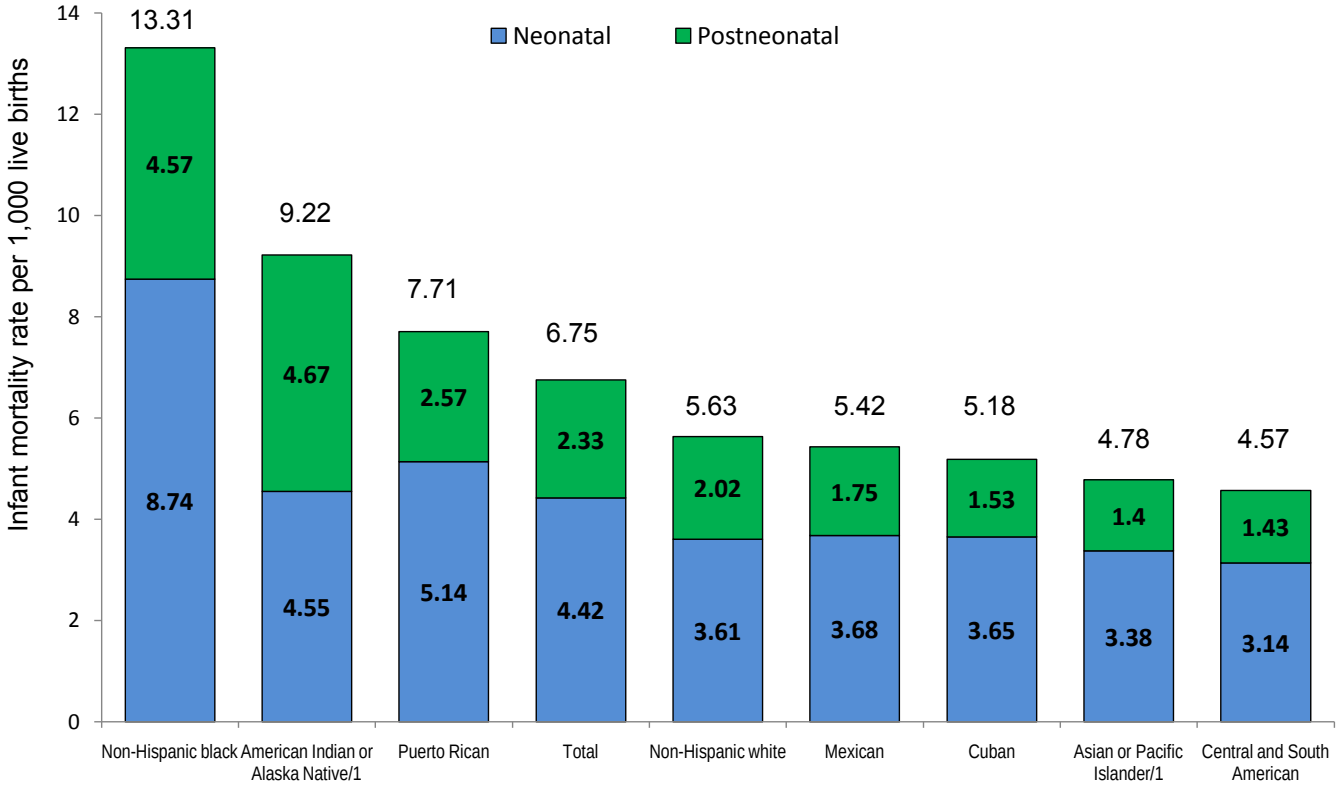
Abstract

Objective: This report presents 2007 period infant mortality statistics from the linked birth/infant death data set (linked file) by a variety of maternal and infant characteristics. The linked file differs from the mortality file which is based entirely on death certificate data.

Figure 1. Infant, neonatal, and postneonatal mortality rates by race and Hispanic origin of mother, United States, 2007



1/ Includes persons of Hispanic and Non-Hispanic origin.
NOTE: Neonatal is less than 28 days and postneonatal is 28 days to under 1 year.
SOURCE: National Vital Statistics System, NCHS, CDC

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Health Statistics
National Vital Statistics System

Methods: Descriptive tabulations of data are presented and interpreted.

Results: The U.S. infant mortality rate was 6.75 infant deaths per 1,000 live births in 2007, not significantly different than the rate of 6.68 in 2006. Infant mortality rates ranged from 4.57 per 1,000 live births for mothers of Central and South American origin to 13.31 for non-Hispanic black mothers. Infant mortality rates were higher for those infants who were born in multiple deliveries and for those whose mothers were born in the 50 States and the District of Columbia and were unmarried. Infant mortality was also higher for male infants and infants born preterm or at low birthweight. The neonatal mortality rate was essentially unchanged from 2006 to 2007 (4.46 and 4.42, respectively). The postneonatal mortality rate increased 5 percent from 2.22 in 2006 to 2.33 in 2007, similar to the rate in 2005 (2.32). Infants born at the lowest gestational ages and birthweights have a large impact on overall US infant mortality. For example, more than half (54 percent) of all infant deaths in the US in 2007 occurred to the 2 percent of infants born very preterm (less than 32 weeks of gestation). Still, infant mortality rates for late preterm infants (34-36 weeks of gestation) were 3.6 times, and those for early term (37-38 weeks) infants were 1.5 times those for infants born at 39-41 weeks of gestation, the gestational age with the lowest infant mortality rate. The three leading causes of infant death - Congenital malformations, low birthweight, and SIDS - accounted for 45 percent of all infant deaths. The percentage of infant deaths that were “preterm-related” was 36.0 percent in 2007. The preterm-related infant mortality rate for non-Hispanic black mothers was 3.4 times higher, and the rate for Puerto Rican mothers was 71 percent higher than for non-Hispanic white mothers.

Keywords: infant mortality, infant health, birthweight, gestational age, maternal characteristics

Introduction

This report presents infant mortality data from the 2007 period linked file. The 2007 period linked file contains a numerator file that consists of all infant deaths occurring in 2007 that have been linked to their corresponding birth certificates, whether the birth occurred in 2006 or in 2007.

In the linked file information from the death certificate is linked to information from the birth certificate for each infant under 1 year of age who died in the 50 states, the District of Columbia, Puerto Rico, the Virgin Islands, or Guam during 2007 (1). Linked birth-infant death data are not available for American Samoa and the Commonwealth of the Northern Marianas. The purpose of the linkage is to use the many additional variables available from the birth certificate to conduct more detailed analyses of infant mortality patterns (2,3). This report presents infant mortality data by race and Hispanic origin of the mother, birthweight, period of gestation, sex of infant, plurality, maternal age, live-birth order, mother’s marital status, mother’s place of birth, age at death, and underlying cause of death (Tables 1 through 8, A through D, and Figures 1 through 4).

Another report, based on data exclusively from the vital statistics mortality file, provides further information on trends in infant mortality and on causes of infant death (4). The linked file is used for analysis and for calculating infant mortality rates by race and ethnicity which are more accurately measured from the birth certificate. Some rates calculated from the mortality file differ from those published using the linked file. A more detailed discussion of the differences in the number of infant deaths and infant mortality rates between the linked file and the mortality file is presented in the Technical Notes.

Methods

Data shown in this report are based on birth and infant death certificates registered in all states, the District of Columbia, Puerto Rico, the Virgin Islands, and Guam. As part of the Vital Statistics Cooperative Program (VSCP), each state provided to the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics (NCHS) matching birth and death certificate numbers for each infant under 1 year of age who died in the state during 2007. When the birth and death occurred in different states, the state of death was responsible for contacting the state of birth identified on the death certificate to obtain the original birth certificate number. NCHS used the matching birth and death certificate numbers provided by the states to extract final edited data from the NCHS natality and mortality statistical files. These data were linked to form a single statistical record, thereby establishing a national linked record file.

After the initial linkage, NCHS returned lists of unlinked infant death records and records with inconsistent data between the birth and death certificates to each state. State additions and corrections were incorporated, and a final national linked file was produced. In 2007, 98.4 percent of all infant death records were successfully linked or matched to their corresponding birth records. Records were weighted to adjust for the 1.6 percent of infant death records that were not linked to their corresponding birth certificates (see the Technical Notes).

Information on births by age, race, or marital status of mother is imputed if it is not reported on the birth certificate. These items were not reported for less than 1 percent of U.S. births in 2007 (2,3).

Race and Hispanic origin are reported independently on the birth certificate. In tabulations of birth data by race and Hispanic origin, data for Hispanic persons are not further classified by race as the vast majority of women of Hispanic origin are reported as white. Data for American Indian or Alaska Native (AIAN) and Asian or Pacific Islander (API) births are not shown separately by Hispanic origin because the vast majority of these populations are non-Hispanic.

Cause-of-death statistics in this publication are classified in accordance with the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision* (ICD-10) (5) (see Technical Notes).

This report includes data based on the 1989 and 2003 revisions of the birth certificate. Twenty-two states and Puerto Rico implemented the 2003 revision of the U.S. Standard Certificate of Live Birth on or before January 1, 2007 (revised). The remaining reporting areas include data which are based on the 1989 revision of the U.S. Standard Certificate of Live Birth (unrevised). Revised and unrevised data are combined when comparable (2,3).

Three key data items are considered non-comparable between the 1989 and 2003 revisions: trimester of pregnancy prenatal care began, maternal educational attainment, and maternal smoking during pregnancy (2,3)(see Technical Notes). Since infants who died in 2007 included those born in both 2006 and 2007 this report includes data on these three topics from the 19 states that implemented the 2003 revision as of January 1, 2006. Data for these limited reporting areas are shown in Table II in the Technical Notes. The 19 states include California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York (excluding New York City), North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming. Data on smoking are not available for California and Florida, and data on prenatal care are not available for California. Results for these three items from the limited reporting area are not generalizable to the country as a whole (2,3,6). The 19 revised states represent 49 percent of all births in 2006.

Data by maternal and infant characteristics

This report presents descriptive tabulations of infant mortality data by a variety of maternal and infant characteristics. These tabulations are useful for understanding the basic relationships between risk factors and infant mortality, *unadjusted for the possible effects of other variables*. In reality, women with one risk factor often have other risk factors as well. For example, teenage mothers are more likely to also be unmarried and of a low-income status and mothers who do not receive prenatal care are more likely to be of a low-income status and uninsured. The preferred method for disentangling the multiple interrelationships among risk factors is multivariate analysis; however, an understanding of the basic relationships between risk factors and infant mortality is a necessary precursor to more sophisticated types of analyses, and is the aim of this publication.

Race and Hispanic origin data - Infant mortality rates are presented here by race and detailed Hispanic origin of mother. The linked file is particularly useful for computing accurate infant mortality rates for this purpose because the race and Hispanic origin of the mother from the birth certificate are used in both the numerator and denominator of the infant mortality rate. In contrast, for the vital statistics mortality file, race information for the denominator is the race of the mother as reported on the birth certificate, whereas the race information for the numerator is the race of the decedent as reported on the death certificate (2,3,5). Thus, standard infant mortality rates can be based on inconsistent race information. Race information from the birth certificate reported by the mother is considered to be more reliable than that from the death certificate where the race and ethnicity of the deceased infant are reported by the funeral director based on information provided by an informant or by observation. These different reporting methods can lead to differences in race and ethnic specific infant mortality rates between the two data files (4,7).

The 2003 revision of the U.S. Standard Certificate of Live Birth allows the reporting of more than one race (multiple races) for each parent (2,3,8,9). Twenty-seven states reported multiple race on their birth certificate for either part or all of 2007 and 23 states in 2006. To provide uniformity and comparability of the data, multiple race is imputed to a single race (see Technical Notes).

Statistical significance - Text statements have been tested for statistical significance, and a statement that a given infant mortality rate is higher or lower than another rate indicates that the rates are significantly different. Information on the methods used to test for statistical significance, as well as information on differences between period and cohort data, the weighting of the linked file, and a comparison of infant mortality data between the linked file and the vital statistics mortality file are presented in the Technical Notes. Additional information on maternal age, marital status, period of gestation, birthweight, and cause-of-death classification is also presented in the Technical Notes.

Results and Discussion

Trends in Infant mortality

The overall 2007 infant mortality rate from the linked file was 6.75 infant deaths per 1,000 live births, not significantly different from the rate of 6.68 in 2006 (Table B) (the 2007 rate from the mortality file was also 6.75) (4). The neonatal mortality rate for 2007 was not significantly different from 2006 (4.42 and 4.46, respectively). The postneonatal mortality rate increased from 2.22 in 2006 to 2.33 in 2007 (Tables A and B).

While the infant mortality rate was 9 percent lower in 2000 (6.89) than in 1995 (7.57), the rate

has declined only 2 percent since 2000 (Table B). There were no significant changes between 2006 and 2007 for any population subgroups (Table B).

Infant mortality by race and Hispanic origin of mother

In 2007 infant mortality rates varied considerably by race and Hispanic origin of mother (10,11). The highest rate, 13.31 per 1,000 live births, was for infants of non-Hispanic black mothers, nearly 3 times greater than the lowest rate of 4.57 for infants of Central and South American mothers. Rates were also fairly high for infants of American Indian or Alaska Native (9.22) and Puerto Rican (7.71) mothers. Rates were intermediate, but all below the US rate, for infants of non-Hispanic white (5.63) and Mexican mothers (5.42) (Figure 1 and Tables A and B). Cuban mothers (5.18) also had low rates. Disparities in the infant mortality rate between non-Hispanic black and non-Hispanic white mothers by state are discussed in the section, ‘‘Disparities in the infant mortality rate by state.’’

Infant mortality by state

To examine variations across states in more detail and to obtain statistically reliable state-specific rates by race and Hispanic origin, three years of data were combined (Table 3). Across the U.S. rates are generally higher in the south and Midwest and lower elsewhere. For 2005-2007 infant mortality rates ranged from 10.64 for Mississippi to 4.88 for Washington and 4.89 for Utah. The highest rate noted (12.80) was for the District of Columbia (D.C.); however, the rate for the D.C. is more appropriately compared with rates for other large U.S. cities, because of the high concentrations of high-risk women in these areas.

Variations in infant mortality rates by state differ among race and Hispanic origin groups. For infants of non-Hispanic black mothers, mortality rates ranged from 21.08 in Hawaii to 7.80 in Washington. For infants of non-Hispanic white mothers, Oklahoma had the highest infant mortality rate (7.85) and New Jersey had the lowest rate (3.49). Among the 41 states where infant mortality rates could be reliably computed (20 or more infant deaths) for Hispanic mothers, Rhode Island had the highest rate (8.73) and Minnesota had the lowest (4.30).

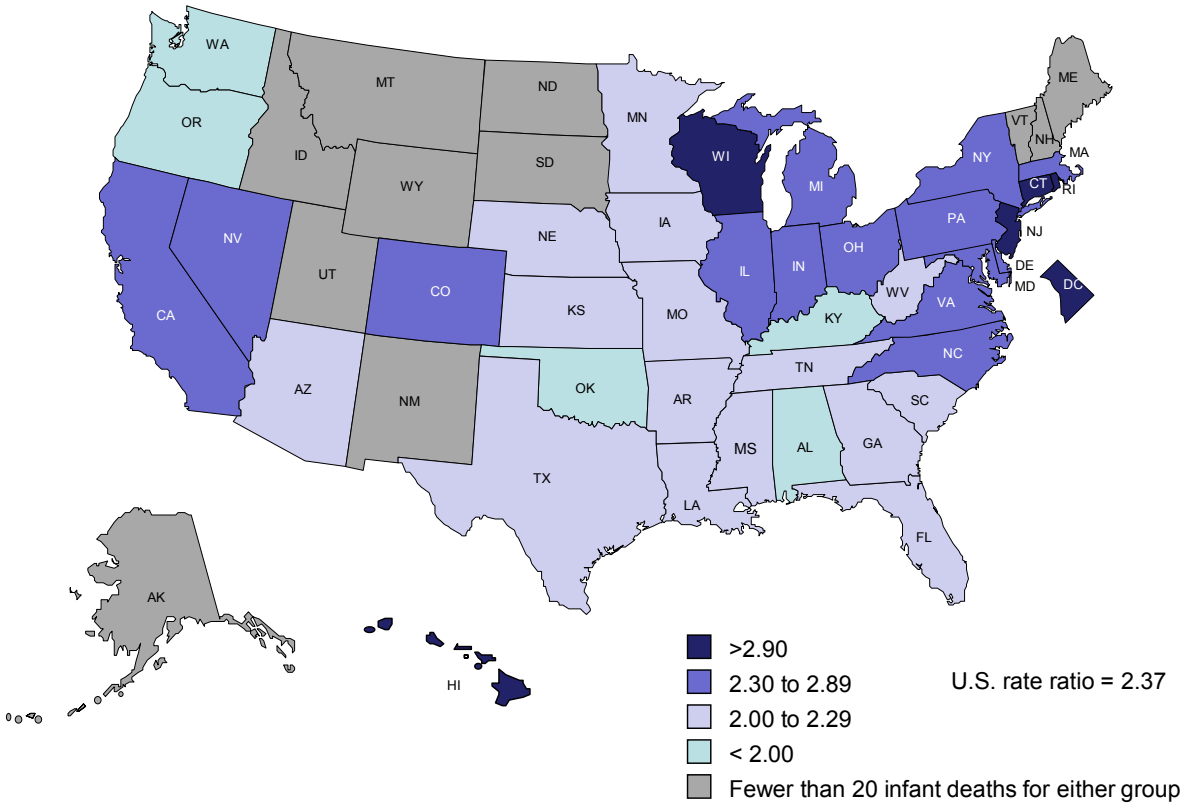
For infants of American Indian or Alaska Native (AIAN) mothers, mortality rates could be reliably computed for only 14 states, and for Asian or Pacific Islander (API) mothers, rates could only be computed for 28 states. For infants of AIAN mothers, mortality rates ranged from 23.19 in Mississippi to 7.29 in New Mexico. Infant mortality rates for infants of API mothers ranged from 7.38 in Utah to 3.38 in New York.

Disparities in the infant mortality rate by state

The data shown in table 3 and summarized above illustrate the wide disparities that exist in infant mortality rates across states. One method for describing race and ethnic disparities in infant mortality is to calculate the ratio between the infant mortality rates of two different race/ethnic groups. The U.S. infant mortality rate ratio for non-Hispanic black relative to non-Hispanic white populations for the three years 2005-2007 was 2.37. Infant mortality rate ratios by state for non-Hispanic black and non-Hispanic white for 2005-2007 are shown in figure 2 and Table 3. It’s important to keep in mind that large ratios can occur for two reasons: the infant mortality rate for non-Hispanic black can be comparatively high, or the rate for non-Hispanic white can be relatively low. The reverse can be true when the rate ratio is low. Several states that lack a calculable infant mortality rate for non-Hispanic black due to fewer than 20 infant deaths do not have a rate ratio shown here.

Areas with the highest rate ratios of 2.9 or greater for 2005-2007 were Hawaii, the District of Columbia, New Jersey, Connecticut, Rhode Island, and Wisconsin. Five areas had ratios less than 2.0: Kentucky, Alabama, Washington, Oklahoma, and Oregon (see Table 3 for rates).

Figure 2. Infant mortality rate ratio of non-Hispanic black and non-Hispanic white by State, 2005-7



Source: National Vital Statistics System, NCHS, CDC

Sex of Infant

In 2007, the overall infant mortality rate for male infants was 7.37 per thousand, 21 percent higher than the rate for female infants (6.11). Infant mortality rates were higher for male than female infants in each race and Hispanic-origin group (Tables 1 and 2), although the difference was not significant for infants of Cuban and Puerto Rican mothers.

Multiple births

For multiple births, the infant mortality rate was 30.33, more than five times the rate of 5.93 for singleton births (Tables 1 and 2). Infant mortality rates for multiple births were higher than the rates for singleton births for all but one of the race and Hispanic-origin groups; rates could not be reliably computed for Cubans due to small numbers of events.

The risk of infant death increases with the increasing number of infants in the pregnancy. In 2007, the infant mortality rate for twins (28.39) was nearly 5 times the rate for singleton births (5.93).

The rate for triplets (64.69) was 11 times, the rate for quadruplets (140.92) was 24 times, and the rate for quintuplet and higher order births (296.70) was 50 times higher than the rate for singleton births (tabular data not shown). Changes in infant mortality rates from 2006 to 2007 for specific multiple birth categories were not statistically significant.

Multiple pregnancy can lead to an accentuation of maternal risks and complications associated with pregnancy (2,12-14). For example, multiple births are much more likely to be born preterm and at low birthweight than singleton births (2,12-14). The higher risk profile of multiple births has a substantial impact on overall infant mortality (13,15). For example, in 2007 multiple births accounted for 3 percent of all live births, but 15 percent of all infant deaths in the US (Table 1).

Age at death

In 2007, nearly two-thirds (65 percent) of all infant deaths occurred during the neonatal period (from birth through 27 days of age) (Figure 1 and Tables A and B). In 2007, the neonatal mortality rate was 4.42 deaths per 1,000 live births, essentially unchanged from the previous year (4.46). The 2007 postneonatal (28 days to under 1 year) mortality rate of 2.33 was 5 percent higher than the 2006 rate (2.22), but was not significantly different from the 2005 rate (2.32)(16).

Non-Hispanic black women had the highest neonatal mortality rate (8.74), followed by Puerto Rican (5.14) and American Indian or Alaska Native (AIAN)(4.55) women. Neonatal mortality rates were lowest for non-Hispanic white (3.61), Asian or Pacific Islander (API)(3.38), Central and South American (3.14), Cuban (3.65), and Mexican (3.68) women (Table A). Neonatal mortality rates did not decline significantly for any race or ethnic group from 2006 to 2007 (Table B).

Infants of non-Hispanic black (4.57) and AIAN (4.67) mothers had the highest postneonatal mortality rates of any group – more than twice those for non-Hispanic white women (2.02) (Tables A and B). The postneonatal mortality rate for Puerto Rican women (2.57) was 27 percent higher than for non-Hispanic white women. In contrast, postneonatal mortality rates for Mexican (1.75), API (1.40), and Central and South American women (1.43) were 13-31 percent lower than for non-Hispanic white women (Table A). Postneonatal mortality rates increased by 9 percent for Mexican women from 2006 to 2007; rates for other race and Hispanic origin groups were essentially unchanged (Table B)(16). Postneonatal mortality rates increased by 5 percent for non-Hispanic white women from 2000 to 2007 but no other groups had a significant change (Table B).

Period of Gestation

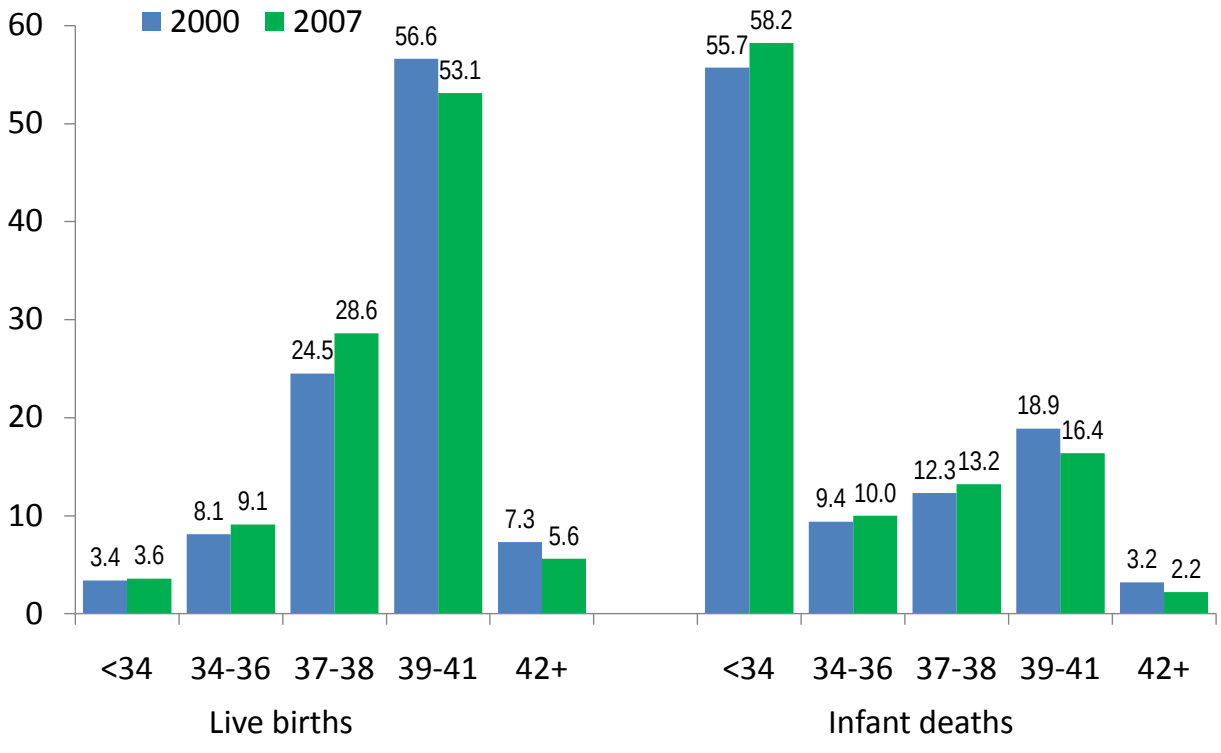
The gestational age of an infant is perhaps the most important predictor of his or her subsequent health and survival. Infants born too small and too soon have a much greater risk of death and both short term and long term disability than those born at term (37-41 weeks of gestation), and the percent of preterm births has been linked to variations in infant mortality rates among countries (17-22). Infant mortality rates are highest for very preterm (<32 weeks) infants, and the risk decreases sharply with increasing gestational age (16,17,21). In 2007, the infant mortality rate for very preterm infants (178.36) was 73 times the rate of 2.43 for term infants (Table D). The infant mortality rate for infants born at 32-33 weeks of gestation was 16.12, more than 6 times the rate for term infants. Although mortality falls with increasing gestational age, even infants born only a few weeks early have a substantially increased risk of death and disability when compared to term infants (23-25). In 2007, the infant mortality rate for late preterm infants (34-36 weeks) was 7.42, 3 times the rate for infants born at term. Even within the term period, infants born at 37-38 weeks of gestation had mortality rates that were 1.5 times higher than those born at 39-41 weeks of gestation (Tables D, 1

and 2). Infant mortality rates for specific gestational age categories were essentially unchanged from 2006 to 2007 (Table D).

Because of their much greater risk of death, infants born at the lowest gestational ages have a large impact on the US infant mortality rate. For example, infants born very preterm (less than 32 weeks of gestation) accounted for only 2 percent of births, but more than one-half (54 percent) of all infant deaths in the United States in 2007 (Table D).

Trends for recent years show that late preterm (34-36 weeks) and early term (37-38) births are making up an ever greater proportion of both live births and infant deaths, and events at 39 weeks of gestation or greater an ever smaller proportion. From 2000 to 2007, the percentage of both live births and infant deaths increased for every gestational age category under 39 weeks, and decreased for every gestational age category of 39 weeks or more (Figure 3). The largest increases were for late preterm (up 12 percent) and early term births (up 17 percent) from 2000 to 2007. Since late preterm and early term births have a significantly higher risk of infant mortality than births at 39-41 weeks of gestation, increases in the proportions of these early births have a negative effect on the US infant mortality rate. The percentage of preterm births has been impacted by rising multiple birth rates, as well as by increases in cesarean section and induction of labor for preterm infants (2, 26-30). Small declines in the percentage of preterm births have been noted in 2008 and 2009 (12, 31).

Figure 3. Percent distribution of live births and infant deaths by gestational age, United States, 2000 and 2007



Source: National Vital Statistics System, NCHS, CDC

There were large differences in the percent of preterm births by race and ethnicity and these differences have a large impact on infant mortality rates (16,31). In 2007, the percent of preterm

births ranged from 10.9 percent of births to API mothers to 18.3 percent of births to non-Hispanic black mothers (Tables 4 and 5). Gestational age-specific infant mortality rates also vary widely by race and ethnicity (Tables 1 and 2). Compared with non-Hispanic white mothers, infant mortality rates were significantly higher for non-Hispanic black mothers for all gestational age categories except for 32-33 weeks, and for American Indian or Alaska Native mothers at 34-36 and 37-41 weeks. Compared with non-Hispanic white mothers, infant mortality rates for API mothers were lower at 34-36 and 37-41 weeks of gestation. For Mexican mothers infant mortality rates were lower at 37-41 weeks of gestation, while for Central and South American mothers infant mortality rates were lower at less than 32, 34-36, and 37-41 weeks of gestation.

Birthweight

Birthweight is another important predictor of infant health. It is closely associated with, but does not exactly correspond with, the period of gestation. Infant mortality rates are highest for the smallest infants and decrease sharply as birthweight increases. In 2007, infant mortality rates were about 25 times higher for low birthweight (less than 2,500 grams) infants (56.12 per 1,000) than for infants with birthweights of 2,500 grams or more (2.29)(Table 1). The infant mortality rate for very low birthweight (less than 1,500 grams) infants was 240.88, more than 100 times the rate for infants with birthweights of 2,500 grams or more. Among the very small infants (less than 500 grams (1 lb. 1 oz. or less)) (Table 6) 86 percent were reported to have died within the first year of life. Reporting of deaths among these very small infants may be incomplete (32). Infant mortality rates were lowest at birthweights of 3,000-4,999 grams.

Because of their much higher mortality rates, infants born at the lowest birthweights have a substantial impact on overall infant mortality rates. For example, infants born weighing less than 1,000 grams accounted for only 0.7 percent of births, but nearly half (47.7 percent) of all infant deaths in the US in 2007 (tabular data not shown). Conversely, 91.8 percent of infants born in the US in 2007 weighed 2,500 grams or more, but these infants accounted for less than one-third (31.3 percent) of infant deaths. The large race and Hispanic-origin variations in the percent of births at low birthweight (less than 2,500 grams)(from 6.5 percent for Mexican mothers to 14.0 percent for non-Hispanic black mothers) mean that some race/ethnic groups are disproportionately impacted by the high infant mortality rates for low birthweight infants (Tables 4 and 5).

From 2000 to 2007, infant mortality rates for the total population declined by 5 percent for infants weighing 500-749 grams, and by 7-11 percent for infants weighing 2,000-3,999 grams at birth (Table 6). Changes for other detailed birthweight categories were not statistically significant.

From 2000 to 2007, for non-Hispanic white women, birthweight-specific infant mortality rates declined for the specific birthweight categories: 500-749, 2,500-2,999 and 3,000-3,499 grams, while for non-Hispanic black women, declines were significant for infants with birthweights of 3,000-3,499 grams. For Hispanic women, infant mortality rates declined for birthweights of 2,500-3999 grams, and for Asian and Pacific Islander women, for 1,500-1,999 grams. There were no significant changes from 2000 to 2007 for any detailed birthweight category for AIAN women. Some of the larger race and Hispanic-origin groups had declines for the summary categories less than 2,500 grams and/or 2,500 grams or more, see table 6.

Maternal age

Infant mortality rates vary with maternal age; in 2007 infants of teenage mothers and mothers aged 40 and over had the highest rates (9.80 and 8.57 respectively). The lowest rates were for

infants of mothers in their late twenties and early thirties (Tables 1 and 2).

In 2007, among births to teenagers, infants of the youngest mothers (under 15 years) had the highest mortality rate (14.53). The rate for infants of mothers aged 15-17 years was 10.27, similar to 2006 (10.42); the rate for infants of mothers aged 18-19 years was 9.49 in 2007 compared with 9.30 in 2006 (tabular data not shown). The rate for infants of mothers aged 20-24 was 7.67 in 2007 compared with 7.55 in 2006.

Within racial and ethnic subgroups, among groups for which rates could be reliably computed, infant mortality rates for births to non-Hispanic white mothers less than 20 years of age were higher than for mothers aged 40 and over. In contrast, for non-Hispanic black and Mexican mothers, rates for births to the oldest mothers were higher than rates for infants of teenagers.

Live birth order

Infant mortality rates were generally higher for first births than for second births, and then generally increased as birth order increased (Tables 1 and 2). Overall, the infant mortality rate for first births (6.75) was 12 percent higher than for second births (5.96). The rate for fifth and higher order births (10.06) was 69 percent higher than the rate for second births. The higher parities and therefore the highest order births (5^{th} child and above) are more likely to be associated with older maternal age, multiple births, and lower socioeconomic status (2,33).

Marital Status

Marital status may be a marker for the presence or absence of social, emotional and financial resources (34,35). Infants of mothers who are not married have been shown to be at higher risk for poor outcomes (36). In 2007, infants of unmarried mothers had an infant mortality rate of 9.17 per 1,000, 78 percent higher than the rate for infants of married mothers (5.16) (Tables 1 and 2). Within each race and Hispanic origin group, infants of unmarried mothers had higher rates of mortality, and with the exception of Cuban and Central and South American infants, these differences were significant.

Nativity

In 2007 the infant mortality rate for mothers born in the 50 States and the District of Columbia (7.15 per 1,000) was 40 percent higher than the rate for mothers born elsewhere (5.10) (Tables 1 and 2). Among race and Hispanic origin groups, mothers born in the 50 States and the District of Columbia had higher infant mortality rates than mothers born elsewhere for non-Hispanic white, non-Hispanic black, Asian or Pacific Islander, and Mexican mothers (Tables 1 and 2).

A variety of hypotheses have been advanced to account for the lower infant mortality rate among infants of mothers born outside the 50 States and the District of Columbia, including possible differences in migration selectivity, social support, and risk behaviors (37,38). Also, women born outside the 50 States and the District of Columbia have been shown to have different characteristics than their U.S. born counterparts with regard to socioeconomic and educational status (39).

Leading causes of infant death

Infant mortality rates for the five leading causes of infant death are presented in Table 7 by race and Hispanic origin of mother. The leading cause of infant death in the United States in 2007 was Congenital malformations, deformations and chromosomal abnormalities (congenital malformations), accounting for 20 percent of all infant deaths. Disorders relating to short gestation and low birthweight, not elsewhere classified (low birthweight) was second, accounting for 17 percent of all infant deaths, followed by Sudden infant death syndrome (SIDS) accounting for 8 percent of infant deaths. The fourth and fifth leading causes in 2007 were Newborn affected by maternal complications of pregnancy (maternal complications) (6 percent), and Accidents (unintentional injuries) (4 percent). Together the five leading causes accounted for 56 percent of all infant deaths in the US in 2007. The order of the top five leading causes was the same as in 2006. The infant mortality rate from unintentional injuries increased by 11 percent from 2006 to 2007, although much of this increase was among the accidental suffocation and strangulation in bed subcategory, and may represent deaths that might formerly have been classified as SIDS. (16,40,41) Infant mortality rates for the other four leading causes did not change significantly from 2006 to 2007.

In 2007, the rank order of leading causes of infant death varied substantially by race and Hispanic origin of the mother. Congenital malformations was the leading cause of infant death for all groups except for non-Hispanic black and Puerto Rican women, for whom low birthweight was the leading cause.

When differences between cause-specific infant mortality rates were examined by race and ethnicity, infant mortality rates from Congenital malformations were 48 percent higher for American Indian, 33 percent higher for non-Hispanic black, and 19 percent higher for Mexican than for non-Hispanic white women.

Infants of non-Hispanic black mothers had the highest mortality rates from low birthweight. The rate for non-Hispanic black mothers was nearly three times the rate for non-Hispanic white mothers. The mortality rate for low birthweight infants of Puerto Rican mothers was more than twice the rate for non-Hispanic white mothers.

Compared with non-Hispanic white mothers, SIDS rates were 2.4 times higher for American Indian or Alaska Native mothers and 1.9 times higher for non-Hispanic black mothers. As most SIDS deaths occur during the postneonatal period, the high SIDS rates for infants of non-Hispanic black and AIAN mothers accounted for much of their elevated risk of postneonatal mortality. Compared with non-Hispanic white mothers, SIDS rates were 52 percent lower for Mexican mothers, 63 percent lower for API mothers, and 74 percent lower for Central and South American mothers.

For maternal complications (which include incompetent cervix, premature rupture of membranes, and multiple pregnancy, for example), infants of non-Hispanic black mothers had the highest mortality rates – nearly 3 times those for non-Hispanic white mothers. Non-Hispanic black women have a much higher percentage of preterm births (Tables 4 and 5), which may help to explain the high infant mortality rates from maternal complications, as this cause occurs predominantly among preterm infants. Infant mortality rates from maternal complications were 14 percent lower for Mexican and 35 percent lower for Central and South American than for non-Hispanic white women.

For AIAN women, the infant mortality rate from unintentional injuries was 2.3 times higher than the rate for non-Hispanic white women. For non-Hispanic black women the rate from unintentional

injuries was double that for non-Hispanic white women. Infant mortality rates from unintentional injuries were 55 percent lower for Mexican and 58 percent lower for API women than for non-Hispanic white women.

Preterm-Related Causes of Death

In order to more fully assess the impact of preterm birth on infant mortality, CDC researchers have developed a grouping of *preterm-related* causes of death. A cause of death was considered preterm-related if 75 percent or more of infants whose deaths were attributed to that cause were born at less than 37 weeks of gestation, and the cause of death was a direct consequence of preterm birth based on a clinical evaluation and review of the literature (42,43).

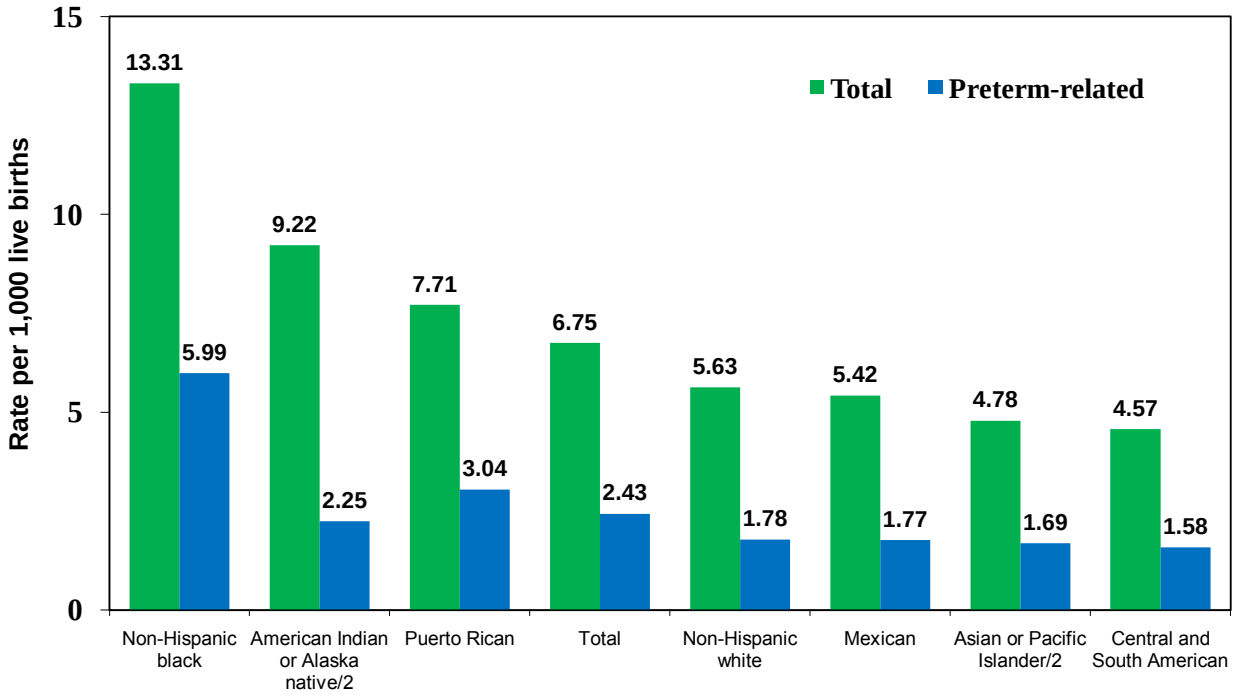
The preterm-related cause-of-death grouping includes Disorders related to short gestation and low birthweight not elsewhere classified, and most of the Maternal complications of pregnancy category from the five leading causes of death. Also included are a variety of other causes of death closely associated with prematurity such as Respiratory distress of newborn, Bacterial sepsis of newborn, Necrotizing enterocolitis of newborn, and others. The comprehensive list of preterm-related cause-of-death categories (ICD-10 codes) is shown in the note on Table 8. Even this comprehensive grouping probably underestimates the total impact of preterm-related infant mortality, as some cause-of-death categories (notably those beginning with the words “Other” and “All other”) had a high percentage of preterm infant deaths but lacked sufficient specificity to be able to establish the etiologic connection to prematurity with any degree of certainty.

Table 8 shows trends in preterm-related infant mortality by race and Hispanic origin of mother from 2000 to 2007. In 2007, 10,498 out of a total of 29,153 infant deaths (36.0 percent) in the United States were preterm-related. The percent preterm-related in 2007 was similar to the level in 2006, 36.1 percent, but four percent higher than in 2000 (34.6 percent).

The impact of preterm-related infant deaths varied considerably by maternal race and ethnicity. In 2007, 45 percent of infant deaths to non-Hispanic black women, and 39 percent of infant deaths to Puerto Rican women were due to preterm-related causes, while the percentage was somewhat lower for other race and ethnic groups (Table 8).

Preterm-related infant mortality *rates* varied considerably by race and ethnicity of the mother (Figure 4 and Table 8). The preterm-related infant mortality rate was 3.4 times higher for non-Hispanic black (5.99) than for non-Hispanic white mothers (1.78). In fact, in 2007, the preterm-related infant mortality rate for non-Hispanic black women was higher than the ***total*** infant mortality rate for non-Hispanic white, Mexican, Central and South American, and Asian or Pacific Islander (API) women. The preterm-related infant mortality rate for Puerto Rican women (3.04) was 71 percent higher, and for American Indian women (2.25) 26 percent higher than for non-Hispanic white women. For Central and South American women, the preterm-related infant mortality rate (1.58) was 11 percent lower than for non-Hispanic white women. Changes in preterm-related infant mortality rates by race and ethnicity from 2006 to 2007 were not statistically significant.

Figure 4. Total and preterm-related/1 infant mortality rates by race and ethnicity of mother: United States, 2007



1/ Preterm-related deaths are those where the infant was born preterm (before 37 completed weeks of gestation) with the underlying cause of death assigned to one of the following ICD-10 categories: K550, P000, P010, P011, P015, P020, P021, P027, P070-P073, P102, P220-P229, P250-279, P280, P281, P360-P369, P520-P523, P77; see Technical notes.

2/ Includes persons of Hispanic and Non-Hispanic origin.

SOURCE: National Vital Statistics System, NCHS, CDC

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List of detailed tables

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Technical notes

Differences between period and cohort data

From 1983–91, NCHS produced linked files in a birth cohort format (44). Beginning with 1995 data, linked files are produced first using a period format and then subsequently using a birth cohort format. The 2007 period linked file contains a numerator file that consists of all infant deaths occurring in 2007 that have been linked to their corresponding birth certificates, whether the birth occurred in 2006 or in 2007. In contrast, the 2007 birth cohort linked file will contain a numerator file that consists of all infant deaths to babies born in 2006 whether the death occurred in 2007 or 2008. Beginning with 1995 data, the period linked file is the basis for all official NCHS linked file statistics.

Weighting

In 2007 a record weight was added to the linked file to compensate for the 1.6 percent of infant death records that could not be linked to their corresponding birth certificates. This procedure was initiated in 1995. Records for Puerto Rico, the Virgin Islands, and Guam were not weighted. The percent of records linked varied by registration area (from 93.6–100.0 percent with all but six areas — Alaska, Arizona, California, Louisiana, Nevada, and Texas at 97.5 percent or higher) (Table I). The number of infant deaths in the linked file for the 50 States and the District of Columbia was weighted to equal the sum of the linked plus unlinked infant deaths by State of occurrence at birth and age at death (less than 7 days, 7–27 days, and 28 days to under 1 year). The addition of the weight reduced the potential for bias in comparing infant mortality rates by characteristics.

The 2007 linked file started with 29,182 infant death records. Of these 29,182 records, 28,715 were linked; 467 were unlinked because corresponding birth certificates could not be identified. The 29,182 linked and unlinked records contained 29 records of infants whose mothers' usual place of residence was outside of United States. These 29 records were excluded to derive a weighted total of 29,153 infant deaths for 2007.

Comparison of infant mortality data between the linked file and the vital statistics mortality file

The overall infant mortality rate from the 2007 period linked file of 6.75 is the same as the 2007 vital statistics mortality file (4). The number of infant deaths differs slightly from the number in the mortality file (29,138) (4). Differences in numbers of infant deaths between the two data sources are primarily due to geographic coverage differences. For the vital statistics mortality file all deaths occurring in the 50 States and the District of Columbia are included regardless of the place of birth of the infant. In contrast, to be included in the US linked file, both the birth and death must occur in the

50 States and the District of Columbia (the territory linked file is a separate file). Also, weighting of the linked file may contribute to small differences in numbers and rates by specific variables between these two data sets.

The 1989 and 2003 Revisions of the U.S. Standard Certificates of Live Birth

This report includes 2007 data on items that are collected on *both* the 1989 Revision of the U.S. Standard Certificate of Live Birth (unrevised) and the 2003 Revision of the U.S. Standard Certificate of Live Birth (revised) (3). The 2003 revision is described in detail elsewhere (45-47).

Maternal education, prenatal care, and smoking during pregnancy

Data for educational attainment, prenatal care, and tobacco use, although collected on both the revised and unrevised certificates, are not considered comparable between revisions. Since the 2007 linked file has birth records from both 2006 and 2007 the reporting areas of these three items from the 2003 revised certificate are those that revised by January 1, 2006. Nineteen states, California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York (excluding New York City), North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington, and Wyoming had implemented the revised birth certificate by January 1, 2006. Data for Florida are excluded in the smoking results because the state's birth certificate question on smoking is not comparable to the 2003 revision (3). Data for California are excluded in the smoking and the prenatal care results because while the state revised it did not revise these items (3).

However, maternal education, prenatal care, and smoking during pregnancy continue to have important relationships with infant mortality rates for smokers, those with late or no prenatal care, or those with less than a high school education (Table II). Analyses of these important variables will be expanded when all of states adopt the 2003 revision.

Marital status

National estimates of births to unmarried women are based on two methods of determining marital status. In 2007, marital status was based on a direct question in 48 states and the District of Columbia. In the two States (Michigan and New York) which used inferential procedures to compile birth statistics by marital status, a birth is inferred as nonmarital if either of these factors, listed in priority-of-use order, is present: a paternity acknowledgment was received or the father's name is missing (3).

Multiple race

For the birth certificates in the 2007 data year, multiple race was reported by 27 states (both revised and non-revised): California, Colorado, Delaware, Florida, Georgia (for births occurring after January 1 only), Hawaii, Idaho, Indiana, Iowa, Kansas, Kentucky, Michigan (for births at most facilities), Minnesota, Nebraska, New Hampshire, New York State (excluding New York City), North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Washington, and Wyoming (3)(Twenty three states reported multiple race in 2006 (48)). Data from the vital records of the remaining states, the District of Columbia, and New York City followed the

1977 OMB standards in which a single race is reported (49,50). In addition, these areas also report the minimum set of four races as stipulated in the 1977 standards, compared with the minimum of five races mandated by the 1997 standards (3).

To provide uniformity and comparability of the data during the transition period, before multiple-race data are available for all reporting areas, it is necessary to bridge the responses of those who reported more than one race to a single race. Multiple race is imputed to a single race (one of the following: AIAN, API, black, or white) according to the combination of races, Hispanic origin, sex, and age indicated on the birth certificate using methods described elsewhere (3,9,51).

Period of gestation

The primary measure used to determine the gestational age of the newborn is the interval between the first day of the mother's last normal menstrual period (LMP) and the date of birth. It is subject to error for several reasons, including imperfect maternal recall or misidentification of the LMP because of postconception bleeding, delayed ovulation, or intervening early miscarriage. These data are edited for LMP-based gestational ages that are clearly inconsistent with the infant's plurality and birthweight (see below), but reporting problems for this item persist and may occur more frequently among some subpopulations and among births with shorter gestations (52,53).

The U.S. Standard Certificate of Live Birth contains an item, "obstetric estimate of gestation," which is compared with length of gestation computed from the date the LMP began when the latter appears to be inconsistent with birthweight. This is done for normal weight births of apparently short gestations and very low birthweight births reported to be full term. The obstetric estimate was also used if the LMP date was not reported. The period of gestation for 5.8 percent of the births in 2007 was based on the obstetric estimate of gestation. For 97 percent of these records, the obstetric estimate was used because the LMP date was not reported. For the remaining **3** percent, the obstetric estimate was used because it was consistent with the reported birthweight, whereas the LMP-based gestation was not. In cases where the reported birthweight was inconsistent with both the LMP-computed gestation and the clinical estimate of gestation, the LMP-computed gestation was used and birthweight was reclassified as "not stated." This was necessary for about 0.01 percent of all birth records in 2007 (3).

Birthweight

For the linked file, not stated birthweight was imputed for 4,048 records or 0.09 percent of the birth records in 2007 when birthweight was not stated but the period of gestation was known. In this case, birthweight was assigned the value from the previous record with the same period of gestation, maternal race, sex, and plurality. If birthweight and period of gestation were both unknown the not stated value for birthweight was retained. This imputation was done to improve the accuracy of birthweight-specific infant mortality rates, since the percent of records with not stated birthweight was higher for infant deaths (3.09 percent before imputation) than for live births (0.11 percent before imputation). The imputation reduced the percent of not stated records to 0.37 percent for infant deaths, and 0.01 percent for births. The not stated birthweight cases in the natality/birth file, as distinct from the linked file, are not imputed (3).

Cause-of-death classification

The mortality statistics presented in this report were compiled in accordance with the World Health Organization (WHO) regulations, which specify that member nations classify and code causes

of death in accordance with the current *revision* of the *International Statistical Classification of Diseases and Related Health Problems*. The ICD provides the basic guidance used in virtually all countries to code and classify causes of death. The ICD not only details disease classification but also provides definitions, tabulation lists, the format of the death certificate, and the rules for coding cause of death. Cause-of-death data presented in this report were coded by procedures outlined in annual issues of the *NCHS Instruction Manual* (54,55).

In this report tabulations of cause-of-death statistics are based solely on the underlying cause of death. The underlying cause is defined by WHO as "the disease or injury which initiated the train of events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury" (5). It is selected from the conditions entered by the physician in the cause-of-death section of the death certificate. When more than one cause or condition is entered by the physician, the underlying cause is determined by the sequence of conditions on the certificate, provisions of the ICD, and associated selection and modification rules. Generally, more medical information is reported on death certificates than is directly reflected in the underlying cause of death. This is captured in NCHS multiple cause-of-death statistics (56,57)**.**

About every 10-20 years, the International Classification of Diseases is revised to take into account advances in medical knowledge. Effective with deaths occurring in 1999, the United States began using the Tenth Revision of the *International Statistical Classification of Diseases and Related Health Problems* (ICD-10) (5); during the period 1979-98, causes were coded and classified according to the Ninth Revision (ICD-9) (58).

Changes in classification of causes of death due to these revisions may result in discontinuities in cause-of-death trends. Measures of this discontinuity are essential to the interpretation of mortality trends, and are discussed in detail in other NCHS publications (4,59,60).

Tabulation lists and cause-of-death ranking

The cause-of-death rankings for ICD-10 are based on the List of 130 Selected Causes of Infant Death. The tabulation lists and rules for ranking leading causes of death are published in the NCHS Instruction Manual, Part 9, ICD-10 Cause-of-Death Lists for Tabulating Mortality Statistics, Effective 1999 (61). Briefly, category titles that begin with the words "Other" and "All other" are not ranked to determine the leading causes of death. When one of the titles that represents a subtotal is ranked (for example, Influenza and pneumonia (J10-J18)), its component parts are not ranked (in this case, Influenza (J10-J11) and Pneumonia (J12-18)).

Preterm-related causes of death

Preterm-related causes of death are those causes that have a direct etiological connection to preterm birth. For an underlying cause of death to be considered preterm-related, 75 percent or more of infants whose deaths were attributed to that cause had to be born preterm, and the cause of death had to be a direct consequence of preterm birth based on a clinical evaluation and review of the literature (42). The cause-of-death categories included in this grouping are shown in the note to table 8. Causes that are incidental to preterm birth (for example, a Motor vehicle accident to a preterm infant) are not included. This grouping of preterm-related causes probably underestimates the total impact of preterm-related infant death, as some ICD categories (notably those beginning with the words "Other" and "All other") had a high percentage of preterm infant deaths but lacked sufficient specificity to be able to establish the etiologic connection to prematurity with any degree of certainty. Further details on the development of this cause-of-death grouping are available in related

publications (42,43).

Computation of rates

Infant mortality rates are the most commonly used index for measuring the risk of dying during the first year of life. For the linked birth/infant death data set they are calculated by dividing the number of infant deaths in a calendar year by the number of live births registered for the same period and are presented as rates per 1,000 or per 100,000 live births. Both the mortality file and the linked birth/infant death file use this computation method but due to unique numbers of infant deaths, as explained in the section above on the comparison of these two files, the rates will often differ for specific variables (particularly for race and ethnicity). Infant mortality rates use the number of live births in the denominator to approximate the population at risk of dying before the first birthday. In contrast to the infant mortality rates based on live births, infant death rates, used only in age-specific death rates with the mortality file, use the estimated population of persons under 1 year of age as the denominator.

For all variables, not stated responses were shown in tables of frequencies, but were dropped before rates were computed. Rates per 1,000 live births display two digits after the decimal place to provide a more precise and sensitive measurement. For rates per 100,000 live births (by cause of death) the infant mortality rate is shown for one decimal place. Adding an additional decimal for rates per 100,000 does not increase precision as it does for rates per 1,000.

As stated previously, infant death records for the 50 States and the District of Columbia in the US linked file are weighted so that the infant mortality rates are not underestimated for those areas that did not successfully link all records.

Random variation in infant mortality rates

The number of infant deaths and live births reported for an area represent complete counts of such events. As such, they are not subject to sampling error, although they are subject to nonsampling error in the registration process. However, when the figures are used for analytic purposes, such as the comparison of rates over time, for different areas, or among different subgroups, the number of events that actually occurred may be considered as one of a large series of possible results that could have arisen under the same circumstances (62). As a result, numbers of births, deaths, and infant mortality rates are subject to random variation. The probable range of values may be estimated from the actual figures according to certain statistical assumptions.

In general, distributions of vital events may be assumed to follow the normal distribution. When the number of events is large, the relative standard error is usually small. When the number of events is small (perhaps less than 100) and the probability of such an event is small, considerable caution must be observed in interpreting the data. Such infrequent events may be assumed to follow a Poisson probability distribution (3,4). Estimates of relative standard errors (RSE's) and 95-percent confidence intervals are shown below.

The formula for the RSE of infant deaths and live births is:

$RSE(D)=100*\sqrt{\frac{1}{D}}$ where *D* is the number of deaths and

RSE(B)=100* $\sqrt{\frac{1}{B}}$ where *B* is the number of births.

For example, let us say that for group A the number of infant deaths was 497 while the number of live births was 81,555 yielding an infant mortality rate of 6.09 infant deaths per 1,000 live births.

The RSE of the deaths = 100* $\sqrt{\frac{1}{497}}$ = 4.49, while the RSE of the births = 100* $\sqrt{\frac{1}{81{,}555}}$ = 0.35.

The formula for the RSE of the IMR is:

RSE(IMR)=100* $\sqrt{\frac{1}{D}+\frac{1}{B}}$

The RSE of the IMR for the example above

= 100* $\sqrt{\frac{1}{497}+\frac{1}{81{,}555}}$ = 4.50.

Normal distribution—When the number of events is greater than 100, the normal distribution is used to estimate the 95-percent confidence intervals as follows:

Lower: R_1 - 1.96 * R_1 * $\frac{\mathrm{RSE}(R_1)}{100}$

Upper: R_1 + 1.96 * R_1 * $\frac{\mathrm{RSE}(R_1)}{100}$

Thus, for Group A:

Lower: 6.09 – (1.96 * 6.09 * $\frac{4.50}{100}$) = 5.55

Upper: 6.09 + (1.96 * 6.09 * $\frac{4.50}{100}$) = 6.63

Thus the chances are 95 out of 100 that the true IMR for Group A lies somewhere in the 5.55–6.63 interval.

Poisson distribution—When the number of events in the numerator is less than 100 the confidence interval for the rate can be estimated based on the Poisson distribution using the values in Table III.

Lower: IMR*L(.95, D_{adj})

Upper: IMR*U(.95, D_{adj})

where D_{adj} is the adjusted number of infant deaths (rounded to the nearest integer) used to take into

account the RSE of the number of infant deaths and live births, and is computed as follows:

$D_{adj} = \frac{D * B}{D + B}$

L(.95, D_{adj}) and U(.95, D_{adj}) refer to the values in Table III corresponding to the value of D_{adj}.

For example, let us say that for Group B the number of infant deaths was 53, the number of live births was 9,241, and the infant mortality rate was 5.74.

$D_{adj} = \frac{53 * 9{,}241}{53 + 9{,}241} = 53$

Therefore the 95-percent confidence interval (using the formula in Table III for 1–99 infant deaths) =

Lower: 5.74*0.74907 = 4.30

Upper: 5.74*1.30802 = 7.51

Comparison of two infant mortality rates—If either of the two rates to be compared is based on less than 100 deaths, compute the confidence intervals for both rates and check to see if they overlap. If so, the difference is not statistically significant at the 95-percent level. If they do not overlap, the difference is statistically significant. If both of the two rates (R_1 and R_2) to be compared are based on 100 or more deaths, the following z-test may be used to define a significance test statistic:

$$z = \frac{R_1 - R_2}{\sqrt{R_1^2\left(\frac{RSE(R_1)}{100}\right)^2 + R_2^2\left(\frac{RSE(R_2)}{100}\right)^2}}$$

If |z| ≥ 1.96, then the difference is statistically significant at the 0.05 level and if |z| < 1.96, the difference is not significant.

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Availability of linked file data

Beginning with 2005, the public-use file no longer includes geographic detail; such files are available upon special request. Linked file data are available for download at:

http://www.cdc.gov/nchs/data_access/VitalStatsOnline.htm.
Prebuilt tables are available at VitalStats: http://www.cdc.gov/nchs/VitalStats.htm Data are also available in issues of Vital and Health Statistics, Series 20, and the *National Vital Statistics Reports* from the NCHS URL: http://www.cdc.gov/nchs .

Table A. Infant, neonatal, and postneonatal deaths and mortality rates by race and Hispanic origin of mother: United States, 2007 linked file

Hispanic origin and race of mother	Live births	Number of deaths			Mortality rate per 1,000 live births		
		Infant	Neonatal	Postneonatal	Infant	Neonatal	Postneonatal
Total	4,316,233	29,153	19,094	10,059	6.75	4.42	2.33
Non-Hispanic white	2,310,333	13,005	8,329	4,676	5.63	3.61	2.02
Non-Hispanic black	627,191	8,351	5,484	2,867	13.31	8.74	4.57
American Indian or Alaska Native	49,443	456	225	231	9.22	4.55	4.67
Asian or Pacific Islander	254,488	1,216	860	357	4.78	3.38	1.40
Hispanic	1,062,779	5,855	3,952	1,903	5.51	3.72	1.79
Mexican	722,055	3,914	2,654	1,260	5.42	3.68	1.75
Puerto Rican	68,488	528	352	176	7.71	5.14	2.57
Cuban	16,981	88	62	26	5.18	3.65	1.53
Central and South American	169,851	777	534	243	4.57	3.14	1.43
Other and unknown Hispanic	85,404	548	349	198	6.42	4.09	2.32

NOTES: Infant deaths are weighted so numbers may not exactly add to totals due to rounding. Neonatal is less than 28 days and postneonatal is 28 days to under 1 year. Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. Persons of Hispanic origin may be of any race. In this table Hispanic women are classified only by place of origin; non-Hispanic women are classified by race. See reference 3. Twenty-seven states reported multiple-race data on the birth certificate for 2007. The mulitple-race data for these states were bridged to the single-race catergories of the 1977 standards for comparibility.

Table B. Infant, neonatal, and postneonatal mortality rates by race and Hispanic origin of mother: United States, 1995, 2000-2007 linked files

Race and Hispanic origin of mother	1995	2000	2001	2002	2003	2004	2005	2006	2007	Percent Change 2000 to 2007	Percent Change 2006 to 2007
Infant mortality rate											
All races	7.57	6.89	6.84	6.95	6.84	6.78	6.86	6.68	6.75	-2.0 **	1.0
Non-Hispanic white	6.28	5.70	5.72	5.80	5.70	5.66	5.76	5.58	5.63	-1.2	0.9
Non-Hispanic black	14.65	13.59	13.46	13.89	13.60	13.60	13.63	13.35	13.31	-2.1	-0.3
American Indian or Alaska Native	9.04	8.30	9.65	8.64	8.73	8.45	8.06	8.28	9.22	11.1	11.4
Asian or Pacific Islander	5.27	4.87	4.73	4.77	4.83	4.67	4.89	4.55	4.78	-1.8	5.1
Hispanic	6.27	5.59	5.44	5.62	5.65	5.55	5.62	5.41	5.51	-1.4	1.8
Mexican	6.03	5.43	5.22	5.42	5.49	5.47	5.53	5.34	5.42	-0.2	1.5
Puerto Rican	8.88	8.21	8.53	8.20	8.18	7.82	8.30	8.01	7.71	-6.1	-3.7
Cuban	5.29	4.54	4.28	3.72	4.57	4.55	4.42	5.08	5.18	14.1	2.0
Central and South American	5.52	4.64	4.98	5.06	5.04	4.65	4.68	4.52	4.57	-1.5	1.1
Neonatal mortality rate											
All races	4.92	4.62	4.54	4.67	4.63	4.52	4.54	4.46	4.42	-4.3 **	-0.9
Non-Hispanic white	4.04	3.78	3.79	3.85	3.79	3.70	3.71	3.64	3.61	-4.5 **	-0.8
Non-Hispanic black	9.65	9.19	8.97	9.33	9.26	9.13	9.13	8.95	8.74	-4.9 **	-2.3
American Indian or Alaska Native	3.94	4.39	4.20	4.60	4.55	4.26	4.04	4.30	4.55	3.6	5.8
Asian or Pacific Islander	3.37	3.43	3.12	3.37	3.40	3.20	3.37	3.18	3.38	-1.5	6.3
Hispanic	4.13	3.77	3.64	3.83	3.92	3.83	3.86	3.74	3.72	-1.3	-0.5
Mexican	3.94	3.61	3.49	3.64	3.76	3.74	3.78	3.73	3.68	1.9	-1.3
Puerto Rican	6.11	5.80	5.99	5.81	5.70	5.34	5.95	5.44	5.14	-11.4	-5.5
Cuban	3.61	3.20	2.50	3.23	3.36	2.81	3.05	3.60	3.65	14.1	1.4
Central and South American	3.65	3.26	3.36	3.45	3.65	3.43	3.23	3.12	3.14	-3.7	0.6
Postneonatal mortality rate											
All races	2.65	2.27	2.30	2.28	2.22	2.25	2.32	2.22	2.33	2.6	5.0 **
Non-Hispanic white	2.23	1.92	1.93	1.95	1.91	1.96	2.05	1.94	2.02	5.2 **	4.1
Non-Hispanic black	5.00	4.40	4.48	4.55	4.34	4.47	4.50	4.40	4.57	3.9	3.9
American Indian or Alaska Native	5.10	3.94	5.45	4.04	4.18	4.19	4.02	3.98	4.67	18.5	17.3
Asian or Pacific Islander	1.90	1.44	1.61	1.40	1.43	1.47	1.51	1.37	1.40	-2.8	2.2
Hispanic	2.14	1.82	1.79	1.79	1.73	1.71	1.76	1.67	1.79	-1.6	7.2
Mexican	2.09	1.82	1.73	1.78	1.73	1.73	1.75	1.61	1.75	-3.8	8.7 **
Puerto Rican	2.77	2.41	2.55	2.38	2.48	2.48	2.37	2.57	2.57	6.6	0.0
Cuban	1.68	*	1.71	*	*	1.74	1.37	1.42	1.53	na	7.7
Central and South American	1.86	1.38	1.61	1.60	1.39	1.22	1.46	1.41	1.43	3.6	1.4

* Figure does not meet standards of reliability or precision; based on fewer than 20 deaths in the numerator.

** Significant at p<.05.

NOTES: Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. Persons of Hispanic origin may be of any race. In this table Hispanic women are classified only by place of origin; non-Hispanic women are classified by race. See reference 2. Twenty-seven states reported multiple-race data on the birth certificate for 2007 and 23 in 2006. The multiple-race data for these states were bridged to the single-race categories of the 1977 standards for comparability with other states; see reference 2 and 3???

Table C. Infant mortality rate by state: 2000, 2006 and 2007 linked files
(By place of residence)

State	Infant mortality rate per1,000 live births			Number of infant deaths in 2007
	2000	2006	2007	
Total	6.89	6.68	6.75	29,153
Alabama	9.51	8.98	9.94	644
Alaska	6.92	7.00	6.61	73
Arizona	6.75	6.36	6.87	707
Arkansas	8.23	8.45	7.81	323
California	5.42	5.04	5.20	2,947
Colorado	6.14	5.77	6.13	434
Connecticut	6.51	6.17	6.70	279
Delaware	9.59	8.09	7.64	93
District of Columbia	12.13	11.85	12.97	115
Florida	6.91	7.26	7.08	1,694
Georgia	8.45	8.07	8.01	1,210
Hawaii	8.09	5.85	6.64	127
Idaho	7.56	6.82	6.83	171
Illinois	8.48	7.29	6.80	1,229
Indiana	7.79	7.91	7.58	681
Iowa	6.43	5.12	5.48	224
Kansas	6.55	7.15	8.00	336
Kentucky	7.10	7.50	6.69	397
Louisiana	9.03	9.96	9.17	608
Maine	4.85	6.29	6.37	90
Maryland	7.51	7.95	8.02	626
Massachusetts	4.61	4.85	4.94	385
Michigan	8.19	7.33	7.94	994
Minnesota	5.62	5.18	5.56	410
Mississippi	10.64	10.53	9.98	464
Missouri	7.19	7.45	7.42	608
Montana	6.02	6.00	6.27	78
Nebraska	7.18	5.54	6.76	182
Nevada	6.45	6.62	6.29	259
New Hampshire	5.82	5.91	5.43	77
New Jersey	6.26	5.44	5.12	594
New Mexico	6.72	5.71	6.14	188
New York	6.40	5.64	5.56	1,409
North Carolina	8.60	8.09	8.52	1,117
North Dakota	8.34	5.92	7.58	67
Ohio	7.66	7.76	7.77	1,172
Oklahoma	8.40	7.96	8.41	463
Oregon	5.57	5.38	5.71	282
Pennsylvania	7.10	7.65	7.53	1,135
Rhode Island	6.24	6.22	7.27	90
South Carolina	8.77	8.32	8.51	535
South Dakota	5.22	6.88	6.28	77
Tennessee	9.11	8.65	8.30	720
Texas	5.60	6.19	6.30	2,567
Utah	5.32	5.12	5.02	277
Vermont	6.46	5.68	5.07	33
Virginia	6.91	7.10	7.73	842
Washington	5.20	4.70	4.88	434
West Virginia	7.38	7.07	7.27	160
Wisconsin	6.64	6.37	6.42	467
Wyoming	6.72	6.78	7.35	58
Guam	6.07	13.73	10.25	36
Puerto Rico	9.60	8.62	8.43	393
Virgin Islands	*	*	*	10

* Figure does not meet standards of reliability or precision; based on fewer than 20 deaths in the numerator.

Table D. Infant mortality rates, and percent distribution of live births and infant deaths by period of gestation, United States, 2000-2007 linked files

	All gestational ages/1	Preterm (less than 37 weeks)				Term (37-41 weeks)			Post-term (42 weeks or more)
		Total preterm	Very preterm (< 32 weeks)	32-33 weeks	Late preterm (34-36 weeks)	Total term	Early term (37-38 weeks)	39-41 weeks	
2007	6.75	36.05	178.36	16.12	7.42	2.43	3.09	2.07	2.62
2006	6.68	35.15	175.94	16.19	7.08	2.39	3.02	2.05	2.80
2005	6.86	36.55	183.24	16.69	7.30	2.43	3.08	2.07	2.66
2004	6.78	36.56	182.47	16.06	7.32	2.39	3.12	2.03	2.87
2003	6.84	37.21	188.24	16.42	7.12	2.42	3.07	2.10	2.88
2002	6.95	37.86	186.39	17.63	7.66	2.48	3.13	2.16	3.07
2001	6.84	36.94	181.00	17.62	7.32	2.54	3.23	2.22	2.95
2000	6.89	37.88	180.95	17.37	7.96	2.59	3.38	2.24	2.91
		Percent distribution of infant deaths/2							
2007	100.0	68.2	54.4	3.8	10.0	29.6	13.2	16.4	2.2
2006	100.0	68.1	54.3	4.0	9.8	29.5	13.2	16.3	2.4
2005	100.0	68.6	54.9	3.9	9.8	29.1	12.9	16.3	2.3
2004	100.0	68.3	54.7	3.8	9.7	29.1	12.7	16.4	2.7
2003	100.0	68.1	55.0	3.8	9.3	29.2	12.3	16.8	2.7
2002	100.0	67.3	53.7	4.0	9.7	29.6	12.2	17.4	3.0
2001	100.0	66.1	52.8	3.8	9.0	30.9	12.5	18.4	3.0
2000	100.0	65.6	52.0	3.7	9.4	31.2	12.3	18.9	3.2
		Percent distribution of live births/2							
2007	100.0	12.7	2.0	1.6	9.0	81.7	28.6	53.1	5.6
2006	100.0	12.8	2.0	1.6	9.1	81.5	28.9	52.6	5.7
2005	100.0	12.7	2.0	1.6	9.1	81.4	28.3	53.1	5.8
2004	100.0	12.5	2.0	1.6	8.9	81.3	27.2	54.1	6.2
2003	100.0	12.3	2.0	1.6	8.8	81.3	27.1	54.2	6.4
2002	100.0	12.1	2.0	1.5	8.6	81.2	26.4	54.8	6.7
2001	100.0	11.9	1.9	1.5	8.4	81.2	25.8	55.3	6.9
2000	100.0	11.6	1.9	1.5	8.1	81.1	24.5	56.6	7.3

[1] Infant mortality rates are deaths less than 1 year per 1,000 live births in specified group.
2 Infant deaths and births with not stated gestational age are subtracted from the total number of events used as denominators for percentage computations.

Table 1. Infant mortality rates, live births, and infant deaths by selected characteristics and race of mother: United States, 2007 linked file

Characteristics	All races	Race of mother			
		White	Black	American Indian or Alaska Native	Asian or Pacific Islander
	Infant mortality rates per 1,000 live births in specified group				
Total	6.75	5.62	12.92	9.22	4.78
Age at death					
Total neonatal	4.42	3.67	8.51	4.55	3.38
Early neonatal (< 7 days)	3.51	2.90	6.80	3.36	2.75
Late neonatal (7-27 days)	0.92	0.77	1.71	1.19	0.62
Postneonatal	2.33	1.94	4.42	4.67	1.40
Sex					
Male	7.37	6.15	14.07	10.13	5.19
Female	6.11	5.06	11.74	8.28	4.33
Plurality					
Single births	5.93	4.92	11.43	8.59	4.16
Plural births	30.33	25.78	51.69	35.10	25.76
Birthweight					
Less than 2,500 grams	56.12	51.23	71.99	63.41	40.87
Less than 1,500 grams	240.88	230.05	261.95	273.16	229.73
1,500-2,499 grams	14.62	15.02	14.55	20.20	9.53
2,500 grams or more	2.29	2.08	3.54	4.81	1.56
Period of gestation					
Less than 32 weeks	178.36	165.13	207.75	156.99	173.30
32-33 weeks	16.12	15.88	16.40	28.51	14.84
34-36 weeks	7.42	6.93	9.27	14.27	5.59
37-41 weeks	2.43	2.21	3.73	4.59	1.67
37-38 weeks	3.09	2.86	4.37	6.14	2.12
39-41 weeks	2.07	1.87	3.33	3.79	1.43
42 weeks or more	2.62	2.36	4.26	*	1.69
Age of mother					
Under 20 years	9.80	8.32	13.59	11.46	11.89
20-24 years	7.67	6.31	13.02	9.57	5.41
25-29 years	5.97	5.01	11.93	7.97	4.22
30-34 years	5.37	4.53	12.35	8.48	3.96
35-39 years	6.20	5.23	14.26	7.62	4.85
40-54 years	8.57	7.28	16.84	*	8.10
Live-birth order					
1	6.75	5.68	13.07	8.05	4.60
2	5.96	5.00	11.88	8.33	4.34
3	6.62	5.50	11.92	11.78	5.81
4	7.79	6.50	13.44	8.56	5.11
5 or more	10.06	7.98	16.62	11.66	7.14
Marital status					
Married	5.16	4.67	11.27	6.93	4.39
Unmarried	9.17	7.39	13.59	10.44	6.76
Mother’s place of birth					
Born in the 50 States and D.C.	7.15	5.75	13.37	9.49	6.32
Born elsewhere	5.10	4.84	8.70	*	4.25

See footnotees at end of table.

Table 1. Infant mortality rates, live births, and infant deaths by selected characteristics and race of mother: United States, 2007 linked file--Con.

Characteristics	All races	Race of mother			
		White	Black	American Indian or Alaska Native	Asian or Pacific Islander
			Live births		
Total	4,316,233	3,336,626	675,676	49,443	254,488
Sex:					
Male	2,208,071	1,708,315	343,279	25,177	131,300
Female	2,108,162	1,628,311	332,397	24,266	123,188
Plurality					
Single births	4,170,845	3,224,813	650,584	48,218	247,230
Plural births	145,388	111,813	25,092	1,225	7,258
Birthweight					
Less than 2,500 grams	355,745	239,449	91,916	3,706	20,674
Less than 1,500 grams	65,249	40,321	21,344	637	2,947
1,500-2,499 grams	290,496	199,128	70,572	3,069	17,727
2,500 grams or more	3,959,945	3,096,785	583,639	45,729	233,792
Not stated	543	392	121	8	22
Period of gestation					
Less than 32 weeks	88,052	56,355	26,826	1,051	3,820
32-33 weeks	68,914	48,356	16,276	912	3,370
34-36 weeks	389,636	286,001	78,168	4,907	20,560
37-41 weeks	3,520,550	2,749,398	517,768	39,001	214,383
37-38 weeks	1,232,462	945,623	198,243	13,672	74,924
39-41 weeks	2,288,088	1,803,775	319,525	25,329	139,459
42 weeks or more	242,235	191,464	35,417	3,485	11,869
Not stated	6,846	5,052	1,221	87	486
Age of mother					
Under 20 years	451,094	318,103	116,006	9,077	7,908
20-24 years	1,082,354	818,503	215,052	16,831	31,968
25-29 years	1,208,408	954,168	170,270	12,425	71,545
30-34 years	961,931	762,239	105,466	7,079	87,147
35-39 years	499,914	395,658	54,567	3,279	46,410
40-54 years	112,532	87,955	14,315	752	9,510
Live-birth order					
1	1,725,699	1,329,109	262,750	17,646	116,194
2	1,363,190	1,068,228	192,186	13,321	89,455
3	722,461	566,483	115,674	8,832	31,472
4	293,941	224,122	55,046	4,789	9,984
5 or more	189,980	134,516	44,528	4,631	6,305
Not stated	20,962	14,168	5,492	224	1,078
Marital status					
Married	2,601,186	2,176,830	194,877	17,177	212,302
Unmarried	1,715,047	1,159,796	480,799	32,266	42,186
Mother’s place of birth					
Born in the 50 States and D.C.	3,231,944	2,569,232	567,497	46,041	49,174
Born elsewhere	1,069,120	759,140	102,880	3,296	203,804
Not stated	15,169	8,254	5,299	106	1,510

See footnotes at end of table.

Table 1. Infant mortality rates, live births, and infant deaths by selected characteristics and race of mother: United States, 2007 linked file--Con.

Characteristics	All races	Race of mother			
		White	Black	American Indian or Alaska Native	Asian or Pacific Islander
		Infant deaths			
Total	29,153	18,749	8,732	456	1,216
Age at death					
Total neonatal	19,094	12,261	5,748	225	860
Early neonatal (< 7 days)	15,139	9,677	4,594	166	701
Late neonatal (7-27 days)	3,956	2,585	1,154	59	158
Postneonatal	10,059	6,487	2,984	231	357
Sex					
Male	16,274	10,506	4,830	255	682
Female	12,880	8,242	3,902	201	534
Plurality					
Single births	24,744	15,867	7,435	414	1,029
Plural births	4,409	2,882	1,297	43	187
Birthweight					
Less than 2,500 grams	19,963	12,266	6,617	235	845
Less than 1,500 grams	15,717	9,276	5,591	174	677
1,500-2,499 grams	4,246	2,990	1,027	62	169
2,500 grams or more	9,081	6,429	2,067	220	365
Not stated	109	54	48	1	6
Period of gestation					
Less than 32 weeks	15,705	9,306	5,573	165	662
32-33 weeks	1,111	768	267	26	50
34-36 weeks	2,890	1,981	725	70	115
37-41 weeks	8,549	6,082	1,929	179	358
37-38 weeks	3,810	2,701	866	84	159
39-41 weeks	4,739	3,381	1,063	96	199
42 weeks or more	635	451	151	13	20
Not stated	264	161	88	3	12
Age of mother					
Under 20 years	4,421	2,647	1,577	104	94
20-24 years	8,297	5,162	2,801	161	173
25-29 years	7,210	4,776	2,032	99	302
30-34 years	5,163	3,455	1,303	60	345
35-39 years	3,098	2,070	778	25	225
40-54 years	964	640	241	7	77
Live-birth order					
1	11,654	7,544	3,434	142	535
2	8,127	5,345	2,283	111	388
3	4,781	3,115	1,379	104	183
4	2,289	1,457	740	41	51
5 or more	1,912	1,073	740	54	45
Not stated	391	215	158	4	14
Marital status					
Married	13,421	10,173	2,197	119	931
Unmarried	15,733	8,575	6,535	337	285
Mother's place of birth					
Born in the 50 States and D.C.	23,119	14,784	7,587	437	311
Born elsewhere	5,454	3,674	895	18	867
Not stated	581	291	250	1	39

* Figure does not meet standards of reliability or precision; based on fewer than 20 deaths in the numerator.

NOTE: Infant deaths are weighted so numbers may not exactly add to totals due to rounding. Not stated responses were included in totals but not distributed among groups for rate computations. Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. In this table all women (including Hispanic women) are classified only according to their race. See reference 2.

Table 2. Infant mortality rates, live births, and infant deaths by selected characteristics and Hispanic origin of mother and by race of mother for mothers of non-Hispanic origin: United States, 2007 linked file

Characteristics	All origins[1]	Hispanic						Non-Hispanic		
		Total	Mexican	Puerto Rican	Cuban	Central and South American	Other and unknown Hispanic	Total[2]	White	Black
	Infant mortality rates per 1,000 live births in specified group									
Total	6.75	5.51	5.42	7.71	5.18	4.57	6.42	7.10	5.63	13.31
Age at death										
Total neonatal	4.42	3.72	3.68	5.14	3.65	3.14	4.09	4.59	3.61	8.74
Early neonatal (< 7 days)	3.51	2.93	2.90	4.21	2.77	2.49	3.11	3.63	2.84	6.98
Late neonatal (7-27 days)	0.92	0.78	0.78	0.93	*	0.65	0.97	0.96	0.77	1.76
Postneonatal	2.33	1.79	1.75	2.57	1.53	1.43	2.32	2.51	2.02	4.57
Sex										
Male	7.37	5.95	5.82	7.91	6.15	5.07	7.19	7.76	6.19	14.48
Female	6.11	5.04	5.00	7.53	4.15	4.05	5.59	6.40	5.03	12.11
Plurality										
Single births	5.93	4.95	4.89	6.65	4.99	4.09	5.81	6.21	4.88	11.77
Plural births	30.33	29.47	29.98	40.63	*	24.95	28.31	30.20	24.56	52.76
Birthweight										
Less than 2,500 grams	56.12	54.72	56.97	56.70	48.20	47.22	51.30	55.91	49.07	72.48
Less than 1,500 grams	240.88	236.63	245.19	231.64	227.27	218.14	216.24	239.88	224.00	262.70
1,500-2,499 grams	14.62	15.79	16.91	14.17	*	11.24	17.80	14.20	14.47	14.61
2,500 grams or more	2.29	1.82	1.81	2.37	1.59	1.50	2.18	2.44	2.19	3.64
Period of gestation										
Less than 32 weeks	178.36	158.71	161.31	172.18	167.79	142.09	154.02	182.01	165.61	209.03
32-33 weeks	16.12	14.64	15.11	*	*	13.52	14.95	16.57	16.23	16.91
34-36 weeks	7.42	6.48	6.67	8.15	*	5.24	6.35	7.69	7.10	9.42
37-41 weeks	2.43	2.03	2.01	2.60	2.02	1.62	2.54	2.55	2.29	3.82
37-38 weeks	3.09	2.63	2.69	3.11	*	2.02	2.99	3.22	2.95	4.45
39-41 weeks	2.07	1.70	1.66	2.32	*	1.41	2.25	2.19	1.95	3.43
42 weeks or more	2.62	2.04	2.10	*	*	*	*	2.81	2.51	4.40
Age of mother										
Under 20 years	9.80	6.91	6.53	9.08	*	6.64	8.44	11.17	9.51	13.80
20-24 years	7.67	5.36	5.21	6.99	6.21	4.70	6.07	8.52	6.80	13.39
25-29 years	5.97	4.89	4.75	7.61	*	4.11	6.03	6.25	5.02	12.42
30-34 years	5.37	4.82	4.99	6.03	5.11	3.77	5.07	5.45	4.35	12.95
35-39 years	6.20	6.24	6.36	9.97	*	4.56	7.12	6.12	4.91	14.51
40-54 years	8.57	9.39	9.71	*	*	7.84	*	8.24	6.44	17.08
Live-birth order										
1	6.75	5.62	5.63	7.70	4.88	4.48	6.21	7.01	5.66	13.47
2	5.96	5.03	4.87	6.95	5.62	4.38	6.01	6.20	4.97	12.27
3	6.62	5.28	5.08	7.72	*	4.76	6.50	7.12	5.62	12.35
4	7.79	5.81	5.62	6.26	*	5.36	8.69	8.74	6.96	13.88
5 or more	10.06	7.27	7.36	13.35	*	4.25	6.16	11.26	8.48	16.89
Marital status										
Married	5.16	4.96	4.88	6.86	4.96	4.51	5.31	5.16	4.57	11.59
Unmarried	9.17	6.03	5.96	8.22	5.50	4.62	7.44	10.55	8.37	14.00
Mother's place of birth										
Born in the 50 States and D.C.	7.15	6.25	6.11	7.60	4.79	4.80	6.53	7.26	5.66	13.55
Born elsewhere	5.10	4.96	4.96	7.73	5.33	4.52	5.31	5.23	4.14	9.82

See footnotes at end of table.

Table 2. Infant mortality rates, live births, and infant deaths by selected characteristics and Hispanic origin of mother and by race of mother for mothers of non-Hispanic origin: United States, 2007 linked file--Con.

Characteristics	All origins[1]	Hispanic						Non-Hispanic			Not Stated
		Total	Mexican	Puerto Rican	Cuban	Central and South American	Other and unknown Hispanic	Total[2]	White	Black	
						Live births					
Total	4,316,233	1,062,779	722,055	68,488	16,981	169,851	85,404	3,222,460	2,310,333	627,191	30,994
Sex											
Male	2,208,071	542,174	368,423	34,882	8,783	86,713	43,373	1,650,061	1,184,634	318,692	15,836
Female	2,108,162	520,605	353,632	33,606	8,198	83,138	42,031	1,572,399	1,125,699	308,499	15,158
Plurality											
Single births	4,170,845	1,038,517	706,778	66,322	16,426	165,883	83,108	3,102,573	2,222,142	603,478	29,755
Plural births	145,388	24,262	15,277	2,166	555	3,968	2,296	119,887	88,191	23,713	1,239
Birthweight											
Less than 2,500 grams	355,745	73,906	47,062	6,755	1,307	11,414	7,368	278,946	168,570	87,496	2,893
Less than 1,500 grams	65,249	13,029	8,259	1,321	220	1,985	1,244	51,550	27,839	20,411	670
1,500-2,499 grams	290,496	60,877	38,803	5,434	1,087	9,429	6,124	227,396	140,731	67,085	2,223
2,500 grams or more	3,959,945	988,836	674,971	61,729	15,674	158,431	78,031	2,943,246	2,141,599	539,607	27,863
Not stated	543	37	22	4	*	6	5	268	164	88	238
Period of gestation											
Less than 32 weeks	88,052	19,281	12,454	1,754	298	2,970	1,805	67,948	37,903	25,566	823
32-33 weeks	68,914	16,735	11,053	1,272	284	2,588	1,538	51,662	32,292	15,380	517
34-36 weeks	389,636	94,307	62,183	6,868	1,696	14,894	8,666	292,542	195,245	73,583	2,787
37-41 weeks	3,520,550	865,964	590,829	54,244	13,836	138,909	68,146	2,629,977	1,912,771	479,104	24,609
37-38 weeks	1,232,462	300,771	202,135	19,280	5,544	47,416	26,396	923,489	655,255	184,825	8,202
39-41 weeks	2,288,088	565,193	388,694	34,964	8,292	91,493	41,750	1,706,488	1,257,516	294,279	16,407
42 weeks or more	242,235	64,325	43,877	4,255	856	10,221	5,116	176,247	129,565	32,500	1,663
Not stated	6,846	2,167	1,659	95	11	269	133	4,084	2,557	1,058	595
Age of mother											
Under 20 years	451,094	150,974	107,749	11,786	1,387	15,368	14,684	297,029	174,201	108,453	3,091
20-24 years	1,082,354	305,262	212,769	21,467	3,866	41,315	25,845	770,086	526,482	200,188	7,006
25-29 years	1,208,408	287,942	194,926	17,487	4,124	49,176	22,229	912,230	675,899	157,302	8,236
30-34 years	961,931	201,430	132,918	11,104	4,504	38,704	14,200	753,404	565,491	97,290	7,097
35-39 years	499,914	95,758	60,722	5,416	2,552	20,186	6,882	399,926	301,530	50,671	4,230
40-54 years	112,532	21,413	12,971	1,228	548	5,102	1,564	89,785	66,730	13,287	1,334
Live-birth order											
1	1,725,699	377,541	242,754	27,394	7,779	66,258	33,356	1,336,245	966,135	243,571	11,913
2	1,363,190	319,474	212,810	20,724	6,054	54,106	25,780	1,034,870	760,014	177,719	8,846
3	722,461	209,222	150,044	11,783	2,167	29,850	15,378	508,535	364,111	107,377	4,704
4	293,941	94,876	70,789	4,955	632	11,938	6,562	196,879	131,988	51,567	2,186
5 or more	189,980	57,903	43,316	3,370	265	7,057	3,895	130,348	78,258	42,262	1,729
Not stated	20,962	3,763	2,342	262	84	642	433	15,583	9,827	4,695	1,616
Marital status											
Married	2,601,186	517,246	360,439	25,070	9,884	80,271	41,582	2,065,403	1,667,712	177,958	18,537
Unmarried	1,715,047	545,533	361,616	43,418	7,097	89,580	43,822	1,157,057	642,621	449,233	12,457
Mother's place of birth											
Born in the 50 States and D.C.	3,231,944	412,876	265,979	49,609	8,147	24,381	64,760	2,796,049	2,166,564	544,864	23,019
Born elsewhere	1,069,120	647,737	455,294	18,362	8,820	145,118	20,143	414,991	138,186	77,906	6,392
Not stated	15,169	2,166	782	517	14	352	501	11,420	5,583	4,421	1,583

See footnotees at end of table.

Table 2. Infant mortality rates, live births, and infant deaths by selected characteristics and Hispanic origin of mother and by race of mother for mothers of non-Hispanic origin: United States, 2007 linked file--Con.

Characteristics	All origins[1]	Hispanic						Non-Hispanic			Not Stated
		Total	Mexican	Puerto Rican	Cuban	Central and South American	Other and unknown Hispanic	Total[2]	White	Black	
						Infant deaths					
Total	29,153	5,855	3,914	528	88	777	548	22,873	13,005	8,351	426
Age at death											
Total neonatal	19,094	3,952	2,654	352	62	534	349	14,795	8,329	5,484	348
Early neonatal (< 7 days)	15,139	3,118	2,094	288	47	423	266	11,712	6,556	4,379	308
Late neonatal (7-27 days)	3,956	834	560	64	15	111	83	3,083	1,773	1,106	39
Postneonatal	10,059	1,903	1,260	176	26	243	198	8,078	4,676	2,867	78
Sex											
Male	16,274	3,228	2,146	276	54	440	312	12,808	7,338	4,615	237
Female	12,880	2,626	1,767	253	34	337	235	10,065	5,667	3,736	188
Plurality											
Single births	24,744	5,140	3,456	441	82	678	483	19,253	10,839	7,100	351
Plural births	4,409	715	458	88	6	99	65	3,620	2,166	1,251	75
Birthweight											
Less than 2,500 grams	19,963	4,044	2,681	383	63	539	378	15,596	8,272	6,342	323
Less than 1,500 grams	15,717	3,083	2,025	306	50	433	269	12,366	6,236	5,362	268
1,500-2,499 grams	4,246	961	656	77	13	106	109	3,230	2,036	980	55
2,500 grams or more	9,081	1,802	1,223	146	25	238	170	7,189	4,695	1,964	90
Not stated	109	9	9	-	-	-	-	88	38	45	12
Period of gestation											
Less than 32 weeks	15,705	3,060	2,009	302	50	422	278	12,367	6,277	5,344	278
32-33 weeks	1,111	245	167	18	2	35	23	856	524	260	10
34-36 weeks	2,890	611	415	56	7	78	55	2,251	1,387	693	28
37-41 weeks	8,549	1,755	1,187	141	28	225	173	6,708	4,389	1,831	87
37-38 weeks	3,810	792	543	60	13	96	79	2,975	1,932	823	43
39-41 weeks	4,739	963	644	81	15	129	94	3,733	2,457	1,008	44
42 weeks or more	635	131	92	10	1	12	16	496	325	143	7
Not stated	264	53	43	1	-	5	3	196	103	81	15
Age of mother											
Under 20 years	4,421	1,043	704	107	7	102	124	3,319	1,657	1,497	59
20-24 years	8,297	1,635	1,109	150	24	194	157	6,562	3,580	2,680	100
25-29 years	7,210	1,408	926	133	12	202	134	5,697	3,393	1,953	105
30-34 years	5,163	971	663	67	23	146	72	4,106	2,462	1,260	86
35-39 years	3,098	598	386	54	15	92	49	2,448	1,482	735	52
40-54 years	964	201	126	17	7	40	12	740	430	227	24
Live-birth order											
1	11,654	2,120	1,367	211	38	297	207	9,368	5,470	3,280	167
2	8,127	1,607	1,037	144	34	237	155	6,418	3,777	2,180	102
3	4,781	1,105	762	91	10	142	100	3,623	2,047	1,326	53
4	2,289	551	398	31	1	64	57	1,720	918	716	17
5 or more	1,912	421	319	45	2	30	24	1,468	664	714	23
Not stated	391	51	30	6	3	7	5	277	128	136	63
Marital status											
Married	13,421	2,563	1,759	172	49	362	221	10,666	7,627	2,062	192
Unmarried	15,733	3,291	2,155	357	39	414	326	12,207	5,378	6,290	234
Mother's place of birth											
Born in the 50 States and D.C.	23,119	2,581	1,625	377	39	117	423	20,312	12,268	7,381	226
Born elsewhere	5,454	3,211	2,258	142	47	656	107	2,171	572	765	72
Not stated	581	63	31	9	2	3	18	390	165	205	128

* Figure does not meet standards of reliability or precision; based on fewer than 20 deaths in the numerator.
- Quantity zero.
1 Includes origin not stated.
2 Includes races other than black or white.

NOTES: Infant deaths are weighted so numbers may not exactly add to totals due to rounding. Not stated responses were included in totals but not distributed among groups for rate computations. Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. Persons of Hispanic origin may be of any race. In this table Hispanic women are classified only by place of origin; non-Hispanic women are classified by race. See reference 2.

Table 3. Infant mortality rates by race and Hispanic origin of mother: United States and each State, Puerto Rico, Virgin Islands, and Guam, 2005-2007 linked files

[By place of residence]

State	Total	Race and Hispanic origin of mother					Ratio of rate, non-Hispanic black and non Hispanic white
		Non-Hispanic White	Non-Hispanic Black	American Indian or Alaska Native	Asian or Pacific Islander	Hispanic	
		Infant mortality rates per 1,000 live births in specified group					
United States[1]	6.76	5.66	13.43	8.54	4.74	5.51	2.37
Alabama	9.49	7.60	14.09	*	*	6.58	1.85
Alaska	6.52	4.68	*	10.15	*	*	*
Arizona	6.69	6.21	13.12	7.77	5.22	6.53	2.11
Arkansas	8.04	6.78	14.00	*	*	5.67	2.06
California	5.19	4.73	11.19	7.46	4.33	4.88	2.37
Colorado	6.11	5.20	13.53	*	4.52	6.98	2.60
Connecticut	6.24	4.59	13.87	*	4.21	7.03	3.02
Delaware	8.24	5.78	13.87	*	*	7.53	2.40
District of Columbia	12.80	4.19	18.63	*	*	5.67	4.45
Florida	7.20	5.73	12.90	*	5.25	5.38	2.25
Georgia	8.05	5.92	12.74	*	5.58	4.87	2.15
Hawaii	6.35	4.21	21.08	*	6.75	5.74	5.01
Idaho	6.56	6.13	*	*	*	7.60	*
Illinois	7.16	5.66	13.81	*	5.52	5.95	2.44
Indiana	7.84	6.91	15.96	*	*	6.40	2.31
Iowa	5.35	5.00	10.36	*	7.19	5.71	2.07
Kansas	7.51	6.87	15.73	*	*	7.08	2.29
Kentucky	6.98	6.45	12.45	*	*	6.17	1.93
Louisiana	9.65	6.56	14.53	*	*	5.14	2.21
Maine	6.51	6.36	*	*	*	*	*
Maryland	7.76	5.23	12.77	*	5.35	5.39	2.44
Massachusetts	4.97	4.19	9.95	*	3.58	5.95	2.37
Michigan	7.72	5.91	15.42	*	4.80	7.66	2.61
Minnesota	5.28	4.59	10.46	9.48	5.20	4.30	2.28
Mississippi	10.64	6.88	15.13	23.19	*	6.38	2.20
Missouri	7.46	6.35	14.44	*	4.81	5.36	2.27
Montana	6.49	5.77	*	9.82	*	*	*
Nebraska	5.99	5.41	12.32	*	*	5.29	2.28
Nevada	6.20	5.47	13.04	*	5.36	5.56	2.38
New Hampshire	5.54	5.35	*	*	*	*	*
New Jersey	5.24	3.49	11.74	*	3.80	5.15	3.36
New Mexico	6.01	6.24	*	7.29	*	5.54	*
New York	5.67	4.47	11.22	*	3.38	5.10	2.51
North Carolina	8.47	6.36	15.16	12.76	5.80	6.32	2.38
North Dakota	6.50	5.98	*	11.28	*	*	*
Ohio	7.90	6.43	15.32	*	5.42	6.62	2.38
Oklahoma	8.11	7.85	13.94	8.50	6.74	5.11	1.78
Oregon	5.69	5.59	8.85	8.96	5.38	5.61	1.58
Pennsylvania	7.49	5.74	14.52	*	5.53	7.87	2.53
Rhode Island	6.65	3.98	11.66	*	*	8.73	2.93
South Carolina	8.75	6.15	14.01	*	*	6.69	2.28
South Dakota	6.70	5.70	*	11.12	*	*	*
Tennessee	8.57	6.85	15.33	*	7.15	6.31	2.24
Texas	6.34	5.67	12.32	*	4.35	5.60	2.17
Utah	4.89	4.73	*	*	7.38	4.86	*
Vermont	5.75	5.62	*	*	*	*	*
Virginia	7.43	5.65	14.17	*	4.59	5.64	2.51
Washington	4.88	4.27	7.80	9.68	4.22	4.49	1.83
West Virginia	7.50	7.25	15.29	*	*	*	2.11
Wisconsin	6.44	5.28	15.46	9.17	5.95	6.24	2.93
Wyoming	6.95	6.53	*	*	*	*	*
Puerto Rico	8.77	---	---	---	---	---	---
Virgin Islands	6.21	*	6.28	*	*	*	*
Guam	11.53	*	*	*	11.91	*	*

* Figure does not meet standards of reliability or precision; based on fewer than 20 deaths in the numerator.
--- Data not available.
1 Excludes data for Puerto Rico, Virgin Islands, and Guam.

NOTES: Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. Persons of Hispanic origin may be of any race. In this table Hispanic women are classified only by place of origin; non-Hispanic women are classified by race. See reference 2.

Table 4. Percent of live births with selected maternal and infant characteristics by race of mother: United States, 2007 linked file

Characteristic	All races	White	Black	American Indian or Alaska Native	Asian or Pacific Islander
Birthweight:					
Less than 1,500 grams	1.51	1.21	3.16	1.29	1.16
Less than 2,500 grams	8.2	7.2	13.6	7.5	8.1
Preterm births[1]	12.7	11.7	18.0	13.9	10.9
Births to mothers under 20 years	10.5	9.5	17.2	18.4	3.1
Fourth and higher order births	11.3	10.8	14.9	19.1	6.4
Births to unmarried mothers	39.7	34.8	71.2	65.3	16.6
Mothers born in the 50 States and D.C.	75.1	77.2	84.7	93.3	19.4

1 Born prior to 37 completed weeks of gestation.

NOTES: Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. In this table all women (including Hispanic women) are classified only according to their race. See reference 2. Twenty-seven states reported multiple-race data on the birth certificate for 2007. The multiple-race data for these states were bridged to the single-race categories of the 1977 standards for comparability with other states; see reference 2.

Table 5. Percent of live births with selected maternal and infant characteristics by Hispanic origin of mother and race of mother for mothers of non-Hispanic origin: United States, 2007 linked file

Characteristic	All origins[1]	Hispanic						Non-Hispanic		
		Total	Mexican	Puerto Rican	Cuban	Central and South American	Other and unknown Hispanic	Total[2]	White	Black
Birthweight:										
Less than 1,500 grams	1.51	1.23	1.14	1.93	1.30	1.17	1.46	1.61	1.21	3.25
Less than 2,500 grams	8.2	7.0	6.5	9.9	7.7	6.7	8.6	8.7	7.3	14.0
Preterm births[3]	12.7	12.3	11.9	14.5	13.4	12.1	14.1	12.8	11.5	18.3
Births to mothers under 20 years	10.5	14.2	14.9	17.2	8.2	9.0	17.2	9.2	7.5	17.3
Fourth and higher order births	11.3	14.4	15.9	12.2	5.3	11.2	12.3	10.2	9.1	15.1
Births to unmarried mothers	39.7	51.3	50.1	63.4	41.8	52.7	51.3	35.9	27.8	71.6
Mothers born in the 50 States and D.C.	75.1	38.9	36.9	73.0	48.0	14.4	76.3	87.0	94.0	87.5

1 Includes origin not stated.
2 Includes races other than black or white.
3 Born prior to 37 completed weeks of gestation.

NOTES: Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. In this table all women (including Hispanic women) are classified only according to their race. See reference 2. Twenty-seven states reported multiple-race data on the birth certificate for 2007. The multiple-race data for these states were bridged to the single-race categories of the 1977 standards for comparability with other states; see reference 2.

Table 6. Live births, infant, neonatal, and postneonatal deaths and mortality rates by race and Hispanic origin of mother and birthweight: United States, 2007 linked file, and percent change in birthweight-specific infant mortality, 2000-2007 linked file

Race and Birthweight	Number in 2007				Mortality rate per 1,000 live births in 2007			Percent change in infant mortality rate 2000-2007
	Live births	Infant deaths	Neonatal deaths	Postneonatal deaths	Infant	Neonatal	Postneonatal	
All races 1	4,316,233	29,153	19,094	10,059	6.75	4.42	2.33	-2.0 **
Less than 2,500 grams	355,745	19,963	16,005	3,959	56.12	44.99	11.13	-5.5 **
Less than 1,500 grams	65,249	15,717	13,523	2,194	240.88	207.25	33.63	-1.4
Less than 500 grams	7,446	6,398	6,216	182	859.25	834.81	24.44	1.6
500-749 grams	12,063	5,479	4,580	898	454.20	379.67	74.44	-4.6 **
750-999 grams	12,818	1,975	1,424	550	154.08	111.09	42.91	-1.1
1,000-1,249 grams	14,936	1,083	770	313	72.51	51.55	20.96	-6.3
1,250-1,499 grams	17,986	782	533	250	43.48	29.63	13.90	-4.6
1,500-1,999 grams	69,067	1,853	1,213	639	26.83	17.56	9.25	-5.1
2,000-2,499 grams	221,429	2,394	1,268	1,126	10.81	5.73	5.09	-7.9 **
2,500 grams or more	3,959,945	9,081	2,981	6,099	2.29	0.75	1.54	-7.3 **
2,500-2,999 grams	797,926	3,305	1,234	2,072	4.14	1.55	2.60	-9.4 **
3,000-3,499 grams	1,687,045	3,556	1,077	2,479	2.11	0.64	1.47	-11.3 **
3,500-3,999 grams	1,144,002	1,729	488	1,241	1.51	0.43	1.08	-9.6 **
4,000-4,499 grams	286,218	392	136	256	1.37	0.48	0.89	-6.8
4,500-4,999 grams	40,218	75	30	45	1.86	0.75	1.12	-9.3
5,000 grams or more	4,536	24	16	7	5.29	*	*	-13.6
Not stated	543	109	108	1	...	...	...	...
White	3,336,626	18,749	12,261	6,487	5.62	3.67	1.94	-1.6
Less than 2,500 grams	239,449	12,266	9,974	2,291	51.23	41.65	9.57	-5.3 **
Less than 1,500 grams	40,321	9,276	8,142	1,134	230.05	201.93	28.12	-1.1
Less than 500 grams	4,194	3,585	3,511	74	854.79	837.15	17.64	0.4
500-749 grams	6,939	3,221	2,788	433	464.19	401.79	62.40	-5.1
750-999 grams	7,968	1,260	948	312	158.13	118.98	39.16	-1.7
1,000-1,249 grams	9,448	709	533	176	75.04	56.41	18.63	-6.3
1,250-1,499 grams	11,772	501	362	139	42.56	30.75	11.81	-4.0
1,500-1,999 grams	46,845	1,312	890	422	28.01	19.00	9.01	-1.5
2,000-2,499 grams	152,283	1,678	943	735	11.02	6.19	4.83	-8.0 **
2,500 grams or more	3,096,785	6,429	2,234	4,195	2.08	0.72	1.35	-7.1 **
2,500-2,999 grams	563,026	2,225	890	1,335	3.95	1.58	2.37	-10.0 **
3,000-3,499 grams	1,300,414	2,520	810	1,710	1.94	0.62	1.31	-11.4 **
3,500-3,999 grams	948,391	1,305	386	919	1.38	0.41	0.97	-8.6 **
4,000-4,499 grams	246,400	304	111	193	1.23	0.45	0.78	-8.9
4,500-4,999 grams	34,786	58	24	33	1.67	0.69	0.95	-6.2
5,000 grams or more	3,768	16	12	4	*	*	*	*
Not stated	392	54	53	1	...	...	...	...
Black	675,676	8,732	5,748	2,984	12.92	8.51	4.42	-4.2 **
Less than 2,500 grams	91,916	6,617	5,155	1,462	71.99	56.08	15.91	-5.0 **
Less than 1,500 grams	21,344	5,591	4,654	937	261.95	218.05	43.90	-1.8
Less than 500 grams	2,872	2,479	2,383	96	863.16	829.74	33.43	3.1
500-749 grams	4,549	1,965	1,547	419	431.96	340.07	92.11	-5.8
750-999 grams	4,224	620	405	216	146.78	95.88	51.14	3.6
1,000-1,249 grams	4,619	313	196	117	67.76	42.43	25.33	-5.5
1,250-1,499 grams	5,080	213	123	90	41.93	24.21	17.72	-6.5
1,500-1,999 grams	17,703	439	250	189	24.80	14.12	10.68	-11.0
2,000-2,499 grams	52,869	588	251	337	11.12	4.75	6.37	-4.6
2,500 grams or more	583,639	2,067	545	1,522	3.54	0.93	2.61	-9.5 **
2,500-2,999 grams	167,917	882	260	622	5.25	1.55	3.70	-6.9
3,000-3,499 grams	260,166	798	188	610	3.07	0.72	2.34	-15.0 **
3,500-3,999 grams	126,195	308	73	235	2.44	0.58	1.86	-13.8
4,000-4,499 grams	25,402	60	15	44	2.36	*	1.73	-1.7
4,500-4,999 grams	3,475	13	5	8	*	*	*	*
5,000 grams or more	484	5	3	2	*	*	*	*
Not stated	121	48	48	-	...	...	...	...

See footnotes at end of table.

Table 6. Live births, infant, neonatal, and postneonatal deaths and mortality rates by race and Hispanic origin of mother and birthweight: United States, 2007 linked file, and percent change in birthweight-specific infant mortality, 2000-2007 linked file--Con

Race and Birthweight	Number in 2007				Mortality rate per 1,000 live births in 2007			Percent change in infant mortality rate 2000-2007
	Live births	Infant deaths	Neonatal deaths	Postneonatal deaths	Infant	Neonatal	Postneonatal	
American Indian 2	49,443	456	225	231	9.22	4.55	4.67	11.1
Less than 2,500 grams	3,706	235	170	65	63.41	45.87	17.54	1.8
Less than 1,500 grams	637	174	142	32	273.16	222.92	50.24	2.2
Less than 500 grams	71	56	52	3	788.73	732.39	*	-12.2
500-749 grams	115	64	54	10	556.52	469.57	*	22.4
750-999 grams	124	16	12	4	*	*	*	*
1,000-1,249 grams	138	20	11	8	144.93	*	*	*
1,250-1,499 grams	189	18	11	6	*	*	*	*
1,500-1,999 grams	710	28	14	14	39.44	*	*	*
2,000-2,499 grams	2,359	33	14	19	13.99	*	*	-10.6
2,500 grams or more	45,729	220	54	166	4.81	1.18	3.63	12.4
2,500-2,999 grams	8,417	75	22	52	8.91	2.61	6.18	44.9
3,000-3,499 grams	18,380	81	20	62	4.41	1.09	3.37	-7.2
3,500-3,999 grams	14,198	51	8	43	3.59	*	3.03	18.9
4,000-4,499 grams	3,940	8	2	6	*	*	*	*
4,500-4,999 grams	692	3	1	2	*	*	*	*
5,000 grams or more	102	2	1	1	*	*	*	*
Not stated	8	1	1	-	...	...	...	...
Asian/Pacific Islander	254,488	1,216	860	357	4.78	3.38	1.40	-1.8
Less than 2,500 grams	20,674	845	705	141	40.87	34.10	6.82	**-8.0**
Less than 1,500 grams	2,947	677	586	91	229.73	198.85	30.88	-1.9
Less than 500 grams	309	278	269	9	899.68	870.55	*	3.8
500-749 grams	460	228	191	37	495.65	415.22	80.43	8.3
750-999 grams	502	78	59	18	155.38	117.53	*	-8.2
1,000-1,249 grams	731	42	30	12	57.46	41.04	*	-16.3
1,250-1,499 grams	945	51	36	15	53.97	38.10	*	-23.8
1,500-1,999 grams	3,809	74	59	14	19.43	15.49	*	-29.8 **
2,000-2,499 grams	13,918	95	60	35	6.83	4.31	2.51	-17.2
2,500 grams or more	233,792	365	149	216	1.56	0.64	0.92	-4.9
2,500-2,999 grams	58,566	123	62	62	2.10	1.06	1.06	-21.1
3,000-3,499 grams	108,085	157	59	97	1.45	0.55	0.90	18.9
3,500-3,999 grams	55,218	64	20	44	1.16	0.36	0.80	-12.8
4,000-4,499 grams	10,476	20	7	12	1.9	*	*	*
4,500-4,999 grams	1,265	1	-	1	*	*	*	*
5,000 grams or more	182	-	-	-	*	*	*	*
Not stated	22	6	6	-	...	...	...	...
Hispanic	1,062,779	5,855	3,952	1,903	5.51	3.72	1.79	-1.4
Less than 2,500 grams	73,906	4,044	3,286	758	54.72	44.46	10.26	**-2.5**
Less than 1,500 grams	13,029	3,083	2,674	409	236.63	205.23	31.39	0.4
Less than 500 grams	1,338	1,107	1,084	23	827.35	810.16	17.19	0.6
500-749 grams	2,397	1,140	970	170	475.59	404.67	70.92	-0.4
750-999 grams	2,646	455	325	130	171.96	122.83	49.13	5.1
1,000-1,249 grams	2,978	236	180	56	79.25	60.44	18.80	5.0
1,250-1,499 grams	3,670	145	115	30	39.51	31.34	8.17	-19.6
1,500-1,999 grams	13,907	454	320	134	32.65	23.01	9.64	-0.5
2,000-2,499 grams	46,970	507	292	215	10.79	6.22	4.58	-6.7
2,500 grams or more	988,836	1,802	656	1,145	1.82	0.66	1.16	**-12.1** **
2,500-2,999 grams	193,314	639	262	376	3.31	1.36	1.95	**-13.4** **
3,000-3,499 grams	435,518	736	254	482	1.69	0.58	1.11	**-12.9** **
3,500-3,999 grams	283,054	319	87	233	1.13	0.31	0.82	**-23.6** **
4,000-4,499 grams	66,396	82	35	47	1.24	0.53	0.71	-0.8
4,500-4,999 grams	9,367	16	10	6	*	*	*	*
5,000 grams or more	1,187	9	8	1	*	*	*	*
Not stated	37	9	9	-	...	...	...	...

See footnotes at end of table.

Table 6. Live births, infant, neonatal, and postneonatal deaths and mortality rates by race and Hispanic origin of mother and birthweight: United States, 2007 linked file, and percent change in birthweight-specific infant mortality, 2000-2007 linked file--Con

Race and Birthweight	Number in 2007				Mortality rate per 1,000 live births in 2007			Percent change in infant mortality rate 2000-2007
	Live births	Infant deaths	Neonatal deaths	Postneonatal deaths	Infant	Neonatal	Postneonatal	
Non-Hispanic White	2,310,333	13,005	8,329	4,676	5.63	3.61	2.02	-1.2
Less than 2,500 grams	168,570	8,272	6,699	1,574	49.07	39.74	9.34	-7.1 **
Less than 1,500 grams	27,839	6,236	5,482	755	224.00	196.92	27.12	-2.4
Less than 500 grams	2,844	2,462	2,408	54	865.68	846.69	18.99	0.7
500-749 grams	4,641	2,108	1,829	280	454.21	394.10	60.33	-7.7 **
750-999 grams	5,478	824	633	191	150.42	115.55	34.87	-5.4
1,000-1,249 grams	6,611	479	358	121	72.45	54.15	18.30	-10.4
1,250-1,499 grams	8,265	363	253	109	43.92	30.61	13.19	1.6
1,500-1,999 grams	33,554	853	565	288	25.42	16.84	8.58	-5.6
2,000-2,499 grams	107,177	1,183	652	531	11.04	6.08	4.95	-7.6
2,500 grams or more	2,141,599	4,695	1,593	3,102	2.19	0.74	1.45	-4.4 **
2,500-2,999 grams	377,594	1,603	631	972	4.25	1.67	2.57	-8.0 **
3,000-3,499 grams	879,971	1,819	566	1,254	2.07	0.64	1.43	-9.2 **
3,500-3,999 grams	674,054	994	297	697	1.47	0.44	1.03	-3.9
4,000-4,499 grams	181,723	227	78	148	1.25	0.43	0.81	-8.1
4,500-4,999 grams	25,647	43	15	28	1.68	*	1.09	-5.1
5,000 grams or more	2,610	8	5	3	*	*	*	*
Not stated	164	38	38	-	...	...	...	...
Non-Hispanic Black	627,191	8,351	5,484	2,867	13.31	8.74	4.57	-2.1
Less than 2,500 grams	87,496	6,342	4,933	1,410	72.48	56.38	16.12	-4.1 **
Less than 1,500 grams	20,411	5,362	4,456	907	262.70	218.31	44.44	-1.1
Less than 500 grams	2,765	2,382	2,289	93	861.48	827.85	33.63	3.0
500-749 grams	4,365	1,884	1,480	404	431.62	339.06	92.55	-5.2
750-999 grams	4,019	587	382	205	146.06	95.05	51.01	3.9
1,000-1,249 grams	4,414	303	188	115	68.65	42.59	26.05	-4.9
1,250-1,499 grams	4,848	206	116	90	42.49	23.93	18.56	-4.4
1,500-1,999 grams	16,874	425	241	183	25.19	14.28	10.85	-9.6
2,000-2,499 grams	50,211	556	236	320	11.07	4.70	6.37	-5.9
2,500 grams or more	539,607	1,964	506	1,458	3.64	0.94	2.70	-7.8 **
2,500-2,999 grams	158,045	845	245	600	5.35	1.55	3.80	-5.6
3,000-3,499 grams	240,922	757	174	583	3.14	0.72	2.42	-14.0 **
3,500-3,999 grams	114,380	288	66	222	2.52	0.58	1.94	-11.9
4,000-4,499 grams	22,709	57	14	42	2.51	*	1.85	4.6
4,500-4,999 grams	3,115	13	5	8	*	*	*	*
5,000 grams or more	436	4	2	2	*	*	*	*
Not stated	88	45	45	-	...	...	...	...

* Figure does not meet standards of reliability or precision; based on fewer than 20 deaths in the numerator.
** Statistically significant at p<.05 level.
... Category not apllicable.
- Quantity zero
1 Includes races other than white or black.
2 Includes Aleuts and Eskimos.

NOTES: Infant deaths are weighted so numbers may not exactly add to totals due to rounding. Neonatal is less than 28 days and postneonatal is 28 days to under 1 year. Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. Persons of Hispanic origin may be of any race. In this table Hispanic women are classified only by place of origin; non-Hispanic women are classified by race. See reference 2.

Table 7. Infant deaths and mortality rates for the five leading causes of infant death by race and Hispanic origin of mother: United States, 2007 linked file

[Rates per 100,000 live births in specified group]

Cause of death (Based on the Tenth Revision, International Classification of Diseases, 1992)	All races			Non-Hispanic White			Non-Hispanic Black			American Indian or Alaska native[1]			Asian or Pacific Islander[2]		
	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate
All causes	...	29,153	675.4	…	13,005	562.9	…	8,351	1,331.5	…	456	922.3	…	1,216	477.8
Congenital malformations, deformations, and chromosomal abnormalities (Q00-Q99)	1	5,823	134.9	1	2,867	124.1	2	1,037	165.3	1	91	184.1	1	284	111.6
Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	2	4,863	112.7	2	1,767	76.5	1	1,864	297.2	3	47	95.1	2	212	83.3
Sudden infant death syndrome (R95)	3	2,461	57.0	3	1,341	58.0	3	677	107.9	2	70	141.6	4	55	21.6
Newborn affected by maternal complications of pregnancy (P01)	4	1,773	41.1	4	751	32.5	4	599	95.5	6	17	*	3	78	30.6
Accidents (unintentional injuries) (V01-X59)	5	1,283	29.7	5	690	29.9	5	381	60.7	4	34	68.8	8	32	12.6

Cause of death (Based on the Tenth Revision, International Classification of Diseases, 1992)	Total Hispanic[3]			Mexican[4]			Puerto Rican[5]			Central and South American[6]		
	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate
All causes	…	5,855	550.9	…	3,914	542.1	…	528	770.9	…	777	457.5
Congenital malformations, deformations, and chromosomal abnormalities (Q00-Q99)	1	1,502	141.3	1	1,067	147.8	2	94	137.3	1	190	111.9
Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	2	900	84.7	2	568	78.7	1	112	163.5	2	141	83.0
Sudden infant death syndrome (R95)	3	310	29.2	4	199	27.6	3	40	58.4	6	26	15.3
Newborn affected by maternal complications of pregnancy (P01)	4	286	26.9	3	201	27.8	4	19	*	3	36	21.2
Accidents (unintentional injuries) (V01-X59)	8	142	13.4	9	98	13.6	9	12	*	11	14	*

... Category not applicable.

* Figure does not meet standards of reliability or precision; based on fewer than 20 deaths in the numerator.

1 For American Indian or Alaska natives, Bacterial sepsis of newborn (P36) was the fifth leading cause of death with 18 deaths.

2 For Asian or Pacific Islanders, Newborn affected by complications of placenta, cord and membranes (P02) was the fifth leading cause of death with 41 deaths and a rate of 16.1.

3 For Hispanics, Newborn affected by complications of placenta, cord and membrances (P02) was the fifth leading cause of death with 230 deaths and a rate of 21.6.

4 For Mexicans, Newborn affected by complications of placenta, cord and membrances (P02) was the fifth leading cause of death with 155 deaths and a rate of 21.5.

5 For Puerto Ricans, Newborn affected by complications of placenta, cord and membranes (P02) was tied for the fourth leading cause of death with 19 deaths.

6 For Central and South Americans, Newborn affected by complications of placenta, cord and membranes (P02) and Neonatal hemorrhage (P50-52,54) were tied for the fourth leading cause of death, each with 28 deaths and a rate of 16.5.

NOTE: Reliable cause-specific infant mortality rates cannot be computed for Cubans because of the small number of infant deaths (88). Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. Persons of Hispanic origin may be of any race. In this table Hispanic women are classified only by place of origin; non-Hispanic women are classified by race. See reference 2. Twenty-seven States reported multiple-race data on the birth certificate for 2007. The multiple-race data for these States were bridged to the single-race categories of the 1977 standards for comparability with other States; see reference 2.

Table 8. Number and percentage of preterm-related infant deaths and preterm-related infant mortality rates by race and Hispanic origin of mother, United States, 2000-2007 linked files

Year	All races and origins	Non-Hispanic white	Non-Hispanic black	American Indian or Alaska native	Asian or Pacific Islander	Total Hispanic[1]	Mexican	Puerto Rican	Central and South American
Number of preterm-related infant deaths									
2007	10,498	4,104	3,755	111	430	1,753	1,276	208	269
2006	10,303	4,134	3,709	100	358	1,868	1,229	221	252
2005	10,364	4,206	3,655	86	401	1,880	1,266	218	241
2004	10,180	4,171	3,641	83	378	1,752	1,192	195	238
2003	10,331	4,358	3,615	91	364	1,761	1,163	200	256
2002	9,965	4,342	3,581	90	321	1,540	1,018	190	192
2001	9,767	4,289	3,561	79	280	1,436	951	196	189
2000	9,673	4,141	3,586	96	298	1,411	929	189	170
Percent of total infant deaths that are preterm-related									
2007	36.0	31.6	45.0	24.3	35.4	29.9	32.6	39.4	34.6
2006	36.1	32.1	45.0	25.3	32.6	33.2	32.0	41.2	33.7
2005	36.5	32.0	45.9	23.8	35.5	34.0	33.0	41.4	34.0
2004	36.5	32.1	46.3	22.4	35.3	33.4	32.2	40.7	35.7
2003	36.9	32.9	46.1	24.2	34.1	34.2	32.4	41.8	37.4
2002	35.6	32.6	44.6	24.6	31.9	31.3	29.9	40.3	30.1
2001	35.5	32.2	44.9	19.6	29.6	31.0	29.8	39.9	31.3
2000	34.6	30.8	43.7	27.7	30.5	30.9	29.4	39.6	32.3
Preterm-related infant mortality rate[2]									
2007	2.43	1.78	5.99	2.25	1.69	1.65	1.77	3.04	1.58
2006	2.42	1.79	6.01	2.10	1.49	1.80	1.71	3.30	1.52
2005	2.50	1.84	6.26	1.92	1.74	1.91	1.83	3.44	1.59
2004	2.48	1.82	6.29	1.89	1.65	1.85	1.76	3.19	1.66
2003	2.53	1.88	6.28	2.11	1.65	1.93	1.78	3.42	1.89
2002	2.48	1.89	6.19	2.12	1.52	1.76	1.62	3.31	1.52
2001	2.43	1.84	6.04	1.89	1.40	1.69	1.56	3.40	1.56
2000	2.38	1.75	5.93	2.30	1.49	1.73	1.60	3.25	1.50

[1] Includes Cuban and other and unknown Hispanic. Cuban data were not shown separately because of small numbers of infant deaths.

[2] Rate per 1,000 live births in specified group.

NOTES: Preterm-related deaths are those where the infant was born preterm (before 37 completed weeks of gestation) with the underlying cause of death assigned to one of the following ICD-10 categories: K550, P000, P010, P011, P015, P020, P021, P027, P070-P073, P102, P220-229, P250-279, P280, P281, P360-369, P520-523, P77. Twenty-three states reported multiple-race data on the birth certificate for all of 2006. The multiple-race data for these states were bridged to the single-race categories of the 1977 standards for comparability with other states; see reference 2.

Table I. Percent of infant death records which were linked to their corresponding birth records: United States and each state, Puerto Rico, Virgin Islands, and Guam, 2007 linked file

State	Percent linked by State of occurrence of death
United States[1]	98.4
Alabama	100.0
Alaska	95.6
Arizona	97.0
Arkansas	100.0
California	95.7
Colorado	100.0
Connecticut	100.0
Delaware	100.0
District of Columbia	99.6
Florida	100.0
Georgia	99.4
Hawaii	100.0
Idaho	100.0
Illinois	98.5
Indiana	99.7
Iowa	100.0
Kansas	100.0
Kentucky	99.1
Louisiana	93.7
Maine	100.0
Maryland	99.8
Massachusetts	99.3
Michigan	99.6
Minnesota	100.0
Mississippi	99.8
Missouri	99.6
Montana	100.0
Nebraska	100.0
Nevada	96.5
New Hampshire	100.0
New Jersey	99.2
New Mexico	98.3
New York State	98.0
New York City	99.1
North Carolina	99.9
North Dakota	100.0
Ohio	98.5
Oklahoma	99.5
Oregon	100.0
Pennsylvania	99.6
Rhode Island	100.0
South Carolina	100.0
South Dakota	100.0
Tennessee	100.0
Texas	93.6
Utah	99.0
Vermont	100.0
Virginia	99.7
Washington	99.8
West Virginia	100.0
Wisconsin	100.0
Wyoming	100.0
Puerto Rico	99.7
Virgin Islands	90.0
Guam	100.0

[1]Excludes data for Puerto Rico, Virgin Islands, and Guam.

Table II. Infant mortality rates for 2007 by trimester of pregnancy prenatal care began, smoking status during pregnancy, and education of mother: 19 state reporting area as of January 1, 2006[1]

[Rates per 1,000 live births in specified group.]

Characteristic	Rate
Prenatal care	
Prenatal care beginning in the 1st trimester	5.57
Prenatal care beginning after the 1st trimester or no care	7.94
Prenatal care beginning in the 2nd or 3rd trimester	6.30
No prenatal care	27.13
Smoking status	
Smoker	10.41
Nonsmoker	6.10
Educational Attainment	
Less than High School Diploma	7.78
High school Diploma	7.17
Some college/technical school	5.79
Bachelor's degree or higher	3.77

[1] Includes data from California, Delaware, Florida, Idaho, Kansas, Kentucky, Nebraska, New Hampshire, New York State (excluding New York City), North Dakota, Ohio, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, Washington and Wyoming. Information on smoking status excludes data for California and Florida. Information on prenatal care excludes data for California. These states are those that revised as of January 1, 2006. See Methods and Technical Notes.

Table III. Values of L and U for calculating 95-percent confidence limits for numbers of events and rates when the number of events is less than 100

N	*L*	*U*	*N*	*L*	*U*
1	0.02532	5.57164	51	0.74457	1.31482
2	0.12110	3.61234	52	0.74685	1.31137
3	0.20622	2.92242	53	0.74907	1.30802
4	0.27247	2.56040	54	0.75123	1.30478
5	0.32470	2.33367	55	0.75334	1.30164
6	0.36698	2.17658	56	0.75539	1.29858
7	0.40205	2.06038	57	0.75739	1.29562
8	0.43173	1.97040	58	0.75934	1.29273
9	0.45726	1.89831	59	0.76125	1.28993
10	0.47954	1.83904	60	0.76311	1.28720
11	0.49920	1.78928	61	0.76492	1.28454
12	0.51671	1.74680	62	0.76669	1.28195
13	0.53246	1.71003	63	0.76843	1.27943
14	0.54671	1.67783	64	0.77012	1.27698
15	0.55969	1.64935	65	0.77178	1.27458
16	0.57159	1.62394	66	0.77340	1.27225
17	0.58254	1.60110	67	0.77499	1.26996
18	0.59266	1.58043	68	0.77654	1.26774
19	0.60207	1.56162	69	0.77806	1.26556
20	0.61083	1.54442	70	0.77955	1.26344
21	0.61902	1.52861	71	0.78101	1.26136
22	0.62669	1.51401	72	0.78244	1.25933
23	0.63391	1.50049	73	0.78384	1.25735
24	0.64072	1.48792	74	0.78522	1.25541
25	0.64715	1.47620	75	0.78656	1.25351
26	0.65323	1.46523	76	0.78789	1.25165
27	0.65901	1.45495	77	0.78918	1.24983
28	0.66449	1.44528	78	0.79046	1.24805
29	0.66972	1.43617	79	0.79171	1.24630
30	0.67470	1.42756	80	0.79294	1.24459
31	0.67945	1.41942	81	0.79414	1.24291
32	0.68400	1.41170	82	0.79533	1.24126
33	0.68835	1.40437	83	0.79649	1.23965
34	0.69253	1.39740	84	0.79764	1.23807
35	0.69654	1.39076	85	0.79876	1.23652
36	0.70039	1.38442	86	0.79987	1.23499
37	0.70409	1.37837	87	0.80096	1.23350
38	0.70766	1.37258	88	0.80203	1.23203
39	0.71110	1.36703	89	0.80308	1.23059
40	0.71441	1.36172	90	0.80412	1.22917
41	0.71762	1.35661	91	0.80514	1.22778
42	0.72071	1.35171	92	0.80614	1.22641
43	0.72370	1.34699	93	0.80713	1.22507
44	0.72660	1.34245	94	0.80810	1.22375
45	0.72941	1.33808	95	0.80906	1.22245
46	0.73213	1.33386	96	0.81000	1.22117
47	0.73476	1.32979	97	0.81093	1.21992
48	0.73732	1.32585	98	0.81185	1.21868
49	0.73981	1.32205	99	0.81275	1.21746
50	0.74222	1.31838			

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